February 1955

RAILWAY TRACK and STRUCTURES

One of Five Specialized Railway Age Publications

This Issue:

How GN Signs Are Reflectorized

B&O's New Freight Terminal

The Art of Track Raising—Part III

Tips on Terminal Maintenance

Contents—Page 35

FORMERLY Railway Engineering and Maintenance

IMPROVE TRACK

Wherever track goes, at river level or over mountains, the maintenance man responsible for its upkeep can be more assured of reducing costs by using our tremendously strong spring washers. They absorb shocks, they protect railends and maintain constant bolt tension.

THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.

"We can depend on our D7 starting in cold weather"

THE temperature dips mighty low in Houlton, Maine, where Donald J. McKay is doing a cold job for the Bangor and Aroostook railroad. From November to May, he contracts to remove ice from refrigerator cars. A CAT* D7 Tractor, equipped with a No. 7S Bulldozer, keeps the track clear of ice.

Mr. McKay, who unloaded 6900 cars last winter, reports: "We can *depend* on our D7 starting in cold weather. There is no doubt about it, it's the most economical tractor I ever owned. And our operators like this machine."

Sure starting in cold weather is another reason that Caterpillar-built equipment has an impressive availability record. An independent two-cylinder gasoline starting engine cranks the diesel, conditioning the engine before any load is placed on it. It circulates the lubricating oil, warms the water, intake air and precombustion chambers.

Result: your tractor is ready to go when your men are, no matter how low the mercury. And you reduce engine wear because the diesel is not brought to running speed while still cold.

Besides the money-saving features in the equipment itself, you're dollars ahead with convenient Caterpillar service. No need to tie up capital in large parts inventories. There are hundreds of Caterpillar Dealer stores throughout the country. You get parts and service quickly no matter where you are.

A few minutes with your Caterpillar Dealer will pay big dividends. He has track-type and wheel-type tractors and motor graders for every size and type of off-track job. And what's more, he'll be more than happy to demonstrate his equipment on your job!

Caterpillar Tractor Co., Peoria, Ill., U.S.A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Leave your special trackwork problems here

A double crossover is a big piece of track, even with Number 6 frogs. Yet this one takes up but a corner of our spacious layout floor, with room for many another!

Yes, we've plenty of room at our Steelton Plant to handle extensive track layouts, and plenty of skill and experience too. So if you're planning a crossover, double slip, or some other complicated item of track, you can bring the problem to Bethlehem trackwork specialists . . . and leave it with them!

Their first move will be to draw up plans for your approval. Next, they'll fabricate the various components needed for the layout, then completely assemble the job in our plant. When everything fits to a T, and all bolt holes, gage and alignment check, they'll matchmark the trackwork to correspond with similar markings on the plan. Then the assembly is torn down and shipped to your job site.

This Bethlehem technique will save you money through elimination of field cutting, curving and drilling of rails. Cuts out scrap loss, too. A Bethlehem engineer will be glad to discuss details and answer your questions. Get in touch with him through the Bethlehem office nearest you.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

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BUILT FOR RAILROAD WORK*

"OXWELD" C-57-R CUTTING BLOWPIPE

Available with standard 75 deg. head and on order with the 90 or 180 deg. head.

*

The OXWELD C-57-R blowpipe is built to give many extra years of economical and trouble-free service even under rugged railroad conditions. Use it to cut steel or wrought iron up to 10 inches thick . . . to remove rivets . . . to gouge out defective metals . . . to prepare parts for welding . . . Or, use it to speed alteration or scrapping work. It will handle any cutting job. And it makes smooth, fast cuts.

Check these OXWELD Brand Features

Here are ten features that make the OXWELD C-57-R blowpipe the most widely used manual flame-cutting tool in the railroad field.

1. Thumb-operated cutting valve lever with handy catch to hold the lever down.
2. Pure rubber cutting valve packing. Extra long life yet inexpensive to replace.
3. Head, injector, and valve bodies are sturdy forgings.
4. Injector set back from cutting nozzle out of direct heat.
5. Operates on low- or medium-pressure acetylene supply.
6. Hose connections are strong, long-lived Monel.
7. Ball-type preheat valves have Monel stems that go through hand wheels — wheels don't loosen or get knocked off.
8. Large-diameter handle helps for operator comfort.
9. Tubing is tough nickel-silver alloy.
10. Chromium plating on all cutting and gouging nozzles helps reflect heat and decreases adherence of molten metal.

RAILROAD DEPARTMENT

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY
Division of Union Carbide Canada Limited, Toronto

Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under the familiar symbol . . .

Partners in Perfection

Precise railroading is no longer a novelty—it's a necessity! Especially in track. But long before high speeds made equal bolt tension and a minimum of expansion, contraction and the elimination of creepage mandatory, the World's Finest Spring Washer, and the World's Most Powerful Rail Anchor were being teamed by precise railroaders to achieve the track perfection so necessary today.

THE VERONA *FIXED* TENSION TRIFLEX SPRING

The only device of its kind providing sufficient bolt tension without going flat —and the means to provide **equal** tension in all bolts. It has the **highest** reactive pressure—**twice** the A.R.E.A. specifications —of any spring washer—"The World's Finest Spring Washer!"

THE *ADVANCED TYPE* WOODINGS RAIL ANCHOR

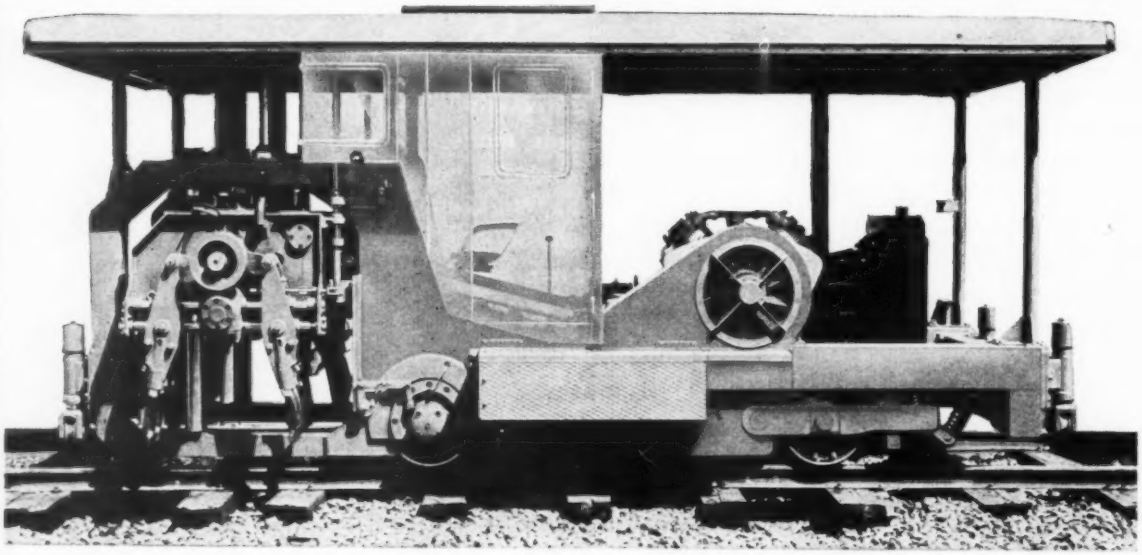
Millions of these anchors are in service today—and **re-service**, too—because it has the highest re-application value of any rail anchor manufactured—ask your branch line supervisor! One piece, two equal grip jaws, four equally-spaced contacts between anchor and rail enabling anchor to adjust itself to tolerances in rail base dimensions—"The World's Most Powerful Rail Anchor!"

Woodings FORGE & TOOL CO.

Woodings-Verona TOOL WORKS

Chicago • VERONA, PA. • St. Louis

PREVIEW . . .



IT'S NEW, tested and proven
smoother, faster!!!!

THE TWO-DEPTH *Matisa* B-24 TAMPER

YOU'LL MEET IT IN PERSON AT
THE N.R.A.A. EXHIBITS . . .
YOU'LL ALSO LEARN ABOUT THE
NEW *Matisa* "pay as you tamp" PLAN

Matisa EQUIPMENT CORPORATION
224 S. Michigan Avenue, Chicago 4, Illinois

News Notes

. . . a resumé of current events throughout the railroad world

RAILWAY
TRACK and STRUCTURES
FEBRUARY, 1955

The Interstate Commerce Commission, in its sixty-eighth annual report to Congress, states that the railroads might well make "more analyses of the benefits which consolidations might confer," and recommends caution in passing legislation to give the railroads more freedom in rate and service matters.

•

A policy board, known as the "Council of Eastern Rail and Truck Common Carriers," has been organized jointly by the eastern railroads and a number of the larger common-carrier truck lines operating in the same general territory. Purpose is to study the common problems of the two groups and to try to reconcile differences between them.

•

The Pennsylvania has inaugurated a new form of "Truc-Train" (Piggyback) service in collaboration with the Rail-Trailer Company. The latter will act as a liaison agent between common-carrier truck lines and the railroad and will manage terminals for loading and unloading the trailers. Two hundred specially built flat cars, each 75-ft long, will carry the trailers in pairs on the PRR's fastest merchandise trains.

•

The Northern Pacific and the Great Northern have cut 24 hr from the running time of westbound transcontinental time—freight trains between the Twin Cities and cities of the Pacific Northwest. The new service permits fourth morning delivery at Seattle, Portland or Tacoma, instead of the present fifth morning delivery.

•

The New York Central, following the lead set recently by the Lackawanna, has taken action to abolish the 10 cents per cwt plus charge assessed lcl shippers for pickup and delivery service.

•

The Southern Pacific is installing radio on a track motor car used by communications linemen. With the installation, linemen will be able to talk with their headquarters and obtain prompt information on line-wire trouble.

•

For the first time since August 1953 Class I railroad showed an increase in net income during a month as compared to the same month of the previous year. Net income, after interest and rentals, was $76 million during November 1954, against $60 million in November 1953. Estimated net income for the first eleven months of last year was $547 million, down $252 million from the $799 million reported for the same period of 1953.

•

The securities of 98 railroads with an aggregate market value of $434,534,000 are included in the portfolios of 137 closed-end and open-end (mutual fund) investment companies. These rail securities represent nearly eight per cent of the investment companies' total assets.

•

The fatality rate on regularly scheduled domestic air lines during 1954 is estimated at 0.09 passengers killed per 100 million passenger-miles flown, according to the Civil Aeronautics Administration. This compares with a rate of 0.16 fatalities per 100 million passenger-miles in 1953.

One of the 160 Uses of CONCRETE on Railroads

NO. 23 OF A SERIES

The photos show some of the 14,250 ft. of sturdy, durable, economical concrete pipe that were installed by the Southern Railway in its new freight classification and forwarding yard near Birmingham, Ala. to provide a cross-yard drainage system.

Concrete pipe for drainage is just one of more than 160 uses for portland cement and concrete which enable American railroads to improve service and save time and money. The moderate first cost of such concrete improvements—plus their long life and low maintenance cost—result in *low-annual-cost* service. This saves money for other budget items.

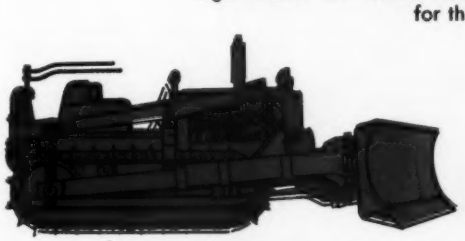
PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete . . through scientific research and engineering field work

New IH Team Provides POWER for PROGRESS

Two 2-wheel, rubber-tired tractors with scrapers and bottom dump wagon

Eight diesel and carbureted crawler tractors with 4 matched scrapers for the TD-24 and TD-18A.



Twenty-six INTERNATIONAL cable, hydraulic blades

Four INTERNATIONAL DROTT Skid-Shovels

Versatile Super A tractor with AI-23 mower

Here's the great new INTERNATIONAL team that delivers low-cost tractor power for every railroad requirement: 8 crawlers, 2 two-wheel, rubber-tired tractors with scrapers and bottom dump wagon, 26 INTERNATIONAL cable and hydraulically controlled bulldozer and *Bullgrader*® blades, 4 Skid-Shovels that outlift all others by 300%, employing Skid-Shoes and exclusive pry-out action, a versatile mowing tractor and 18 dependable diesel and carbureted power units.

Each INTERNATIONAL equipment combination is a unit that solves your embankment restoration, cuts cleaning, drainage, mowing, shop or yard problems fast and with a minimum of manpower.

Let your INTERNATIONAL Industrial Power Distributor show you what we mean with an on-the-job demonstration at your convenience with the INTERNATIONAL equipment of your choice.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL HARVESTER

INTERNATIONAL
INDUSTRIAL POWER
MAKES EVERY LOAD A PAYLOAD

A KERSHAW Jack FOR EVERY PURPOSE

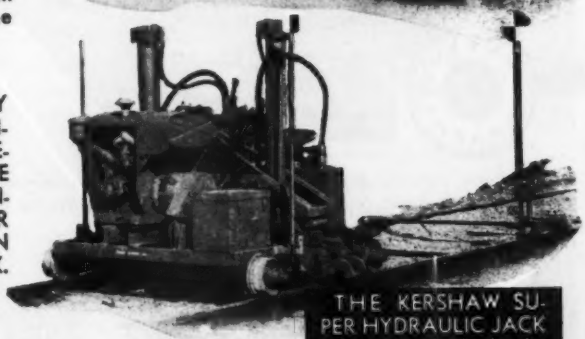
Whatever your track raising problem might be, Kershaw Manufacturing Co. has a jack that will do the job better and more economically. All four of the machines shown here were developed to do a better job for a special track raising job problem.

And look at the results! Here's what one Eastern Railroad accomplished using the regular Jackall in out of face surfacing and timbering operations:

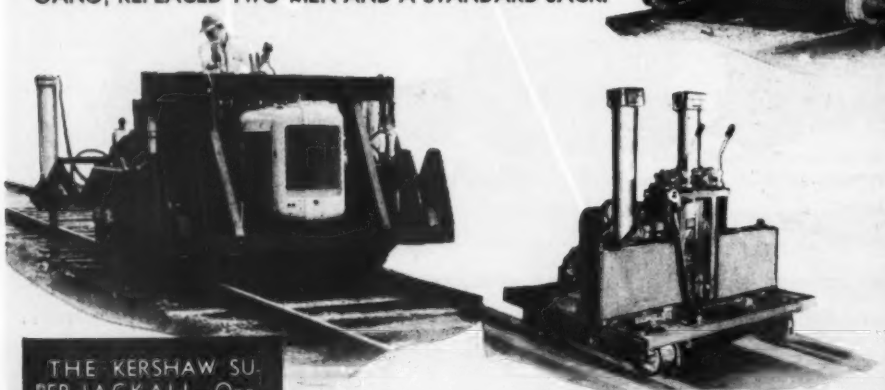
The Jackall was assigned the task of pulling a 2 3/4 inch raise for the timbering operation. This was followed by the final surfacing operation. Here's what happened:

THE KERSHAW JACKALL WORKED APPROXIMATELY ONE MILE OF TRACK PER DAY JACKING AND CATCHING OFF A 2 3/4 INCH RAISE ENABLING TIES TO BE REPLACED AT THE RATE OF 600 TO 700 PER DAY. . . . THE JACKALL WAS USED TO CATCH OFF JOINTS AND CENTERS PULLING APPROXIMATELY 600 TO 700 FEET PER HOUR. . . . THE JACKALL, WORKING IN A 60-MAN GANG, REPLACED TWO MEN AND A STANDARD JACK.

The KERSHAW JACK-ALL—One-man operated hydraulic jack and tamper which tamps ends of tie. Provided with automatic rail dogs and hydraulic operated tampers.



THE KERSHAW SUPER HYDRAULIC JACK—Completely hydraulic controlled and self-propelled. One-man operated, this jack may be used to speed up surfacing and timbering operations.



THE KERSHAW SUPER JACKALL—One-man operated hydraulic jack and vibrating tamper which tamps sides of tie. Provided with automatic rail dogs.

THE KERSHAW HYDRAULIC JACK—Similar to Super Jack except it is not self-propelled. Above photo shows "custom made" jack for 36 gauge. Any Kershaw machine can be tailor made to suit your specifications.

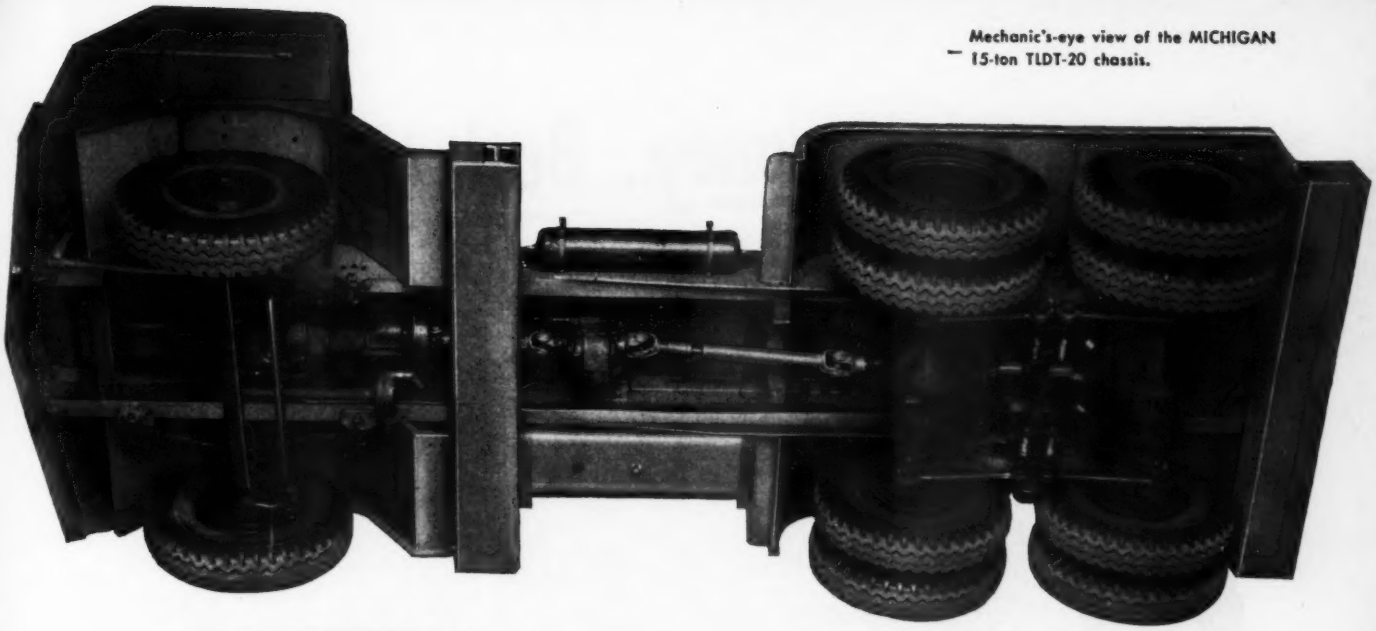
Trackwork Equipment Developed and Proven on the Job

KERSHAW KRIBBER • RAIL AND UTILITY DERRICKS • JACK-ALL • TIE REPLACER • HYDRAULIC TRACK JACK • TRACK BROOM • BALLAST REGULATOR, SCARIFIER AND PLOW • MOCAR CRANE • TRACK CRANE • SET-OFFS

RECOGNIZE THIS SYMBOL OF LEADERSHIP

KERSHAW MANUFACTURING CO INC

KERSHAW MFG. CO., Inc. MONTGOMERY, ALA.

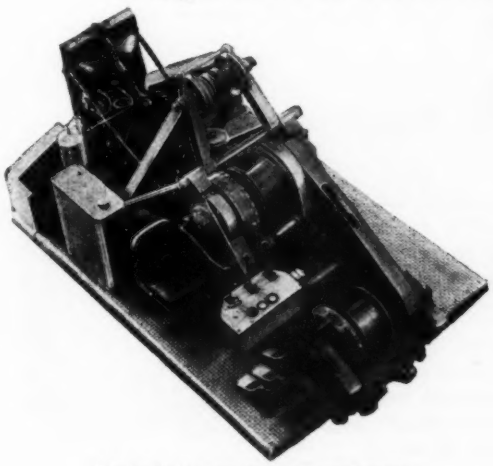


Mechanic's-eye view of the MICHIGAN 15-ton TLDT-20 chassis.

NEWS!... More Quality Features

are Standard Equipment on MICHIGAN

½ yard models than on any comparable machine



The basic ½-yard turntable mechanism —maximum service accessibility.

Front-view of four of the MICHIGAN's six adjustable hook rollers.

In your point-for-point comparison (a smart buying tactic!) take special note of these great value features—"extras" on many other makes, standard on MICHIGAN ½ yard Truck Excavator-Cranes.

16-Ton Axles — tremendous strength! No wonder your MICHIGAN stands years of punishment.

404 Cubic-inch Truck Engine—huge power! Compare it to other ½-yard machines.

Cast Steel Turntable—machinery deck with boom hinge-pin bracket and hook roller brackets in a single rugged steel casting.

6 Hook Rollers—on most others you get only 3 or 4. MICHIGAN rollers are ball-bearing mounted for friction-free swings and tapered for easy adjustment.

Air Powered Clutches—famous for smooth, positive action; faster swing; minimum fatigue; and easy, quick service.

Ball Bearings—on all shafts and drums.

Power Up and Power Down — on the front drum for precision crane work.

Add these up and get this sure-thing, profitable answer: You Move More With A MICHIGAN. For more information, contact your local MICHIGAN distributor. Or send us the coupon.

MICHIGAN Tractor Shovels are available under the Clark Leasing Plan—we'll be glad to send you details.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY 26
Construction Machinery Division
492 Second St., Benton Harbor, Michigan

☐ Please send MICHIGAN ½-yard Bulletin ☐ Send Lease Plan data sheet

Name_____ Title_____

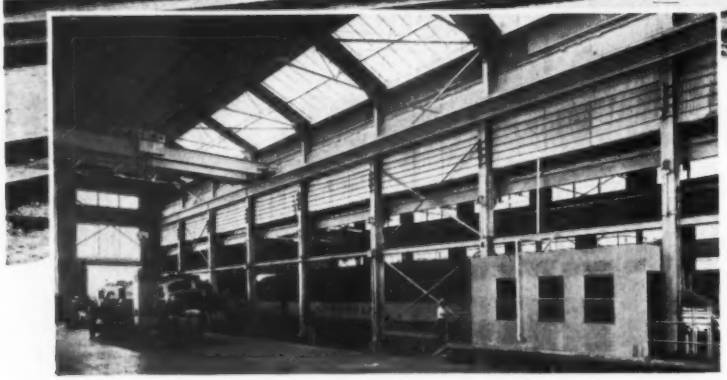
Firm_____

Address_____

City_____ County_____ State_____

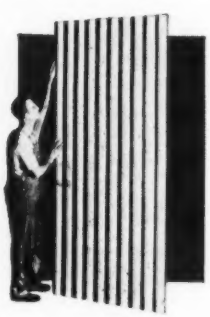
Built to save money... Built to last...

Diesel engine house of the Seaboard Air Line Railroad shows how Corrugated Transite was used in combination with glass to provide an attractive, maintenance-free exterior.



Interior view showing type of construction used. The office (right foreground) is built with flat Transite sheets.

. . . with asbestos-cement CORRUGATED TRANSITE*



FOR MODERN, ATTRACTIVE, low-maintenance diesel shops . . . the nation's leading railroads are building with time-tested Corrugated Transite.

This Johns-Manville asbestos-cement product is moulded under pressure into fireproof, rustproof, and rotproof sheets that never require paint or other preservative treatment . . . are virtually maintenance-free. Important, too, in structures housing diesel equipment, they will not absorb oil-laden exhaust fumes which might create a fire hazard.

Construction is fast, too, because Corrugated Transite comes in large sheets (from 3 to 11 feet long, 42 inches wide) that cover large areas quickly. It is easy to cut or drill . . . requires only a minimum of framework . . . and can be readily fastened to either steel or wood.

You will find Corrugated Transite equally adaptable for roofing or siding—on either new or remodeled structures. It can be used alone, or in combination with other materials such as brick, glass or stone.

Save money in the housing of *your* diesel equipment by building with Corrugated Transite. Write for further details to Johns-Manville, Box 290, New York 16, N. Y. In Canada: 565 Lake Shore Rd., Port Credit, Ont. Ask for Brochure TR-45-A.

*REG. U. S. PAT. OFF.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

97 YEARS OF SERVICE TO TRANSPORTATION

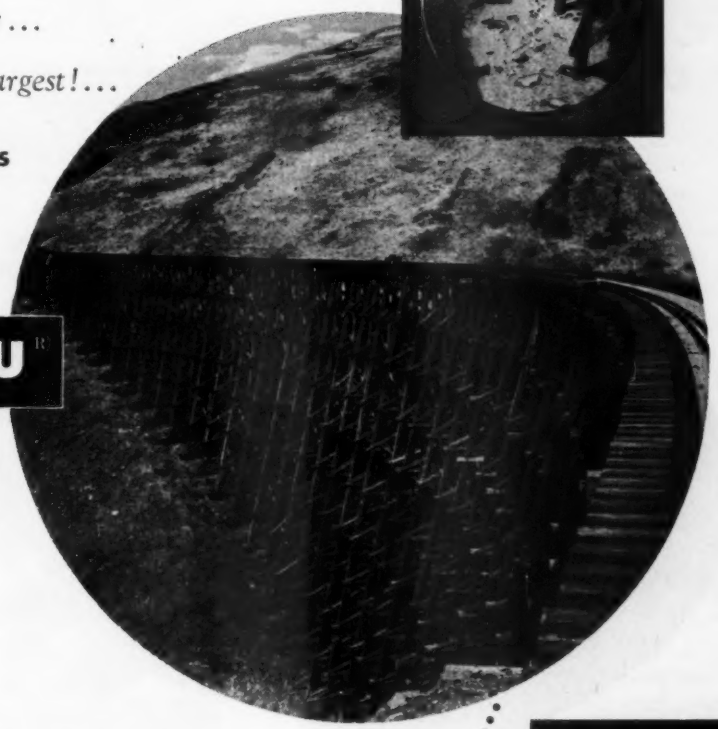
Timber Trestles Everywhere...

Including the World's Largest!...

safe from fire-hazardous weeds and grasses because of

BORASCU®

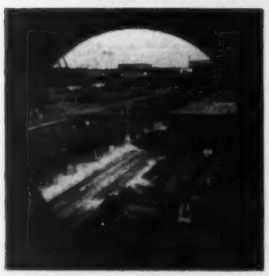
weed killer



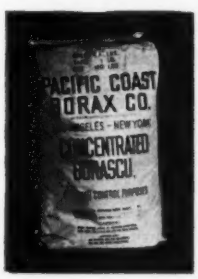
● WHEN BORASCU'S IN...WEEDS STAY OUT!

Weeds and grasses can't grow on ground that has been properly treated with Borascu! It destroys weeds and it stops them—that's one reason more roads use Borascu than any other weed-killer for protecting timber structures from disastrous grass and brush fires. Economy, ease of application, safety, and long-lasting results are other deciding factors for this popularity of Borascu over all others. A free demonstration of Borascu on your road, under all conditions, is yours for the asking. Write for details today!

QUICKLY APPLIED ANYWHERE



MAKES YARDS—SIDINGS SAFER



NOTHING TO MIX

NO WATER TO HAUL

NONPOISONOUS

NONCORROSIVE
TO FERROUS METALS

PACIFIC COAST BORAX CO.
DIVISION OF BORAX CONSOLIDATED LIMITED
630 SO. SHATTO PLACE • LOS ANGELES 5, CALIFORNIA

SALES OFFICES LOCATED IN ALL PRINCIPAL CITIES FROM COAST TO COAST AND FROM CANADA TO VENEZUELA

AT THE FRONTIERS OF PROGRESS YOU'LL FIND... AN AIR REDUCTION PRODUCT

deposit 60% more metal per hour

(and bank your savings)

with the NEW "EASYARC LH 7-16" electrode!

Introduced at the 1954 Metal Show! The new "EASYARC LH 7-16" is a spectacular innovation in low hydrogen welding. It's the first contact-type electrode of its class that provides these savings in time and operating cost.

SPEED! In comparative tests "EASYARC LH 7-16" deposited 6.58 pounds of metal per hour – actually 61.3% more metal than conventional low hydrogen electrodes of the same diameter.

PERFORMANCE! "EASYARC LH 7-16" produces outstanding results with hard-to-weld steels, where highest quality is essential. Welds proved to have excellent stretch and toughness characteristics – no underbead cracking.

NEW EASE OF OPERATION! Slag removal is a fast, simple operation. Typical easy arc striking. Good restriking properties. Low rate of spatter.

For more detailed information contact your nearest Airco office.

AIRCO®

AIR REDUCTION

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Divisions of Air Reduction Company, Incorporated, with offices in most principal cities

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Foreign Subsidiaries:
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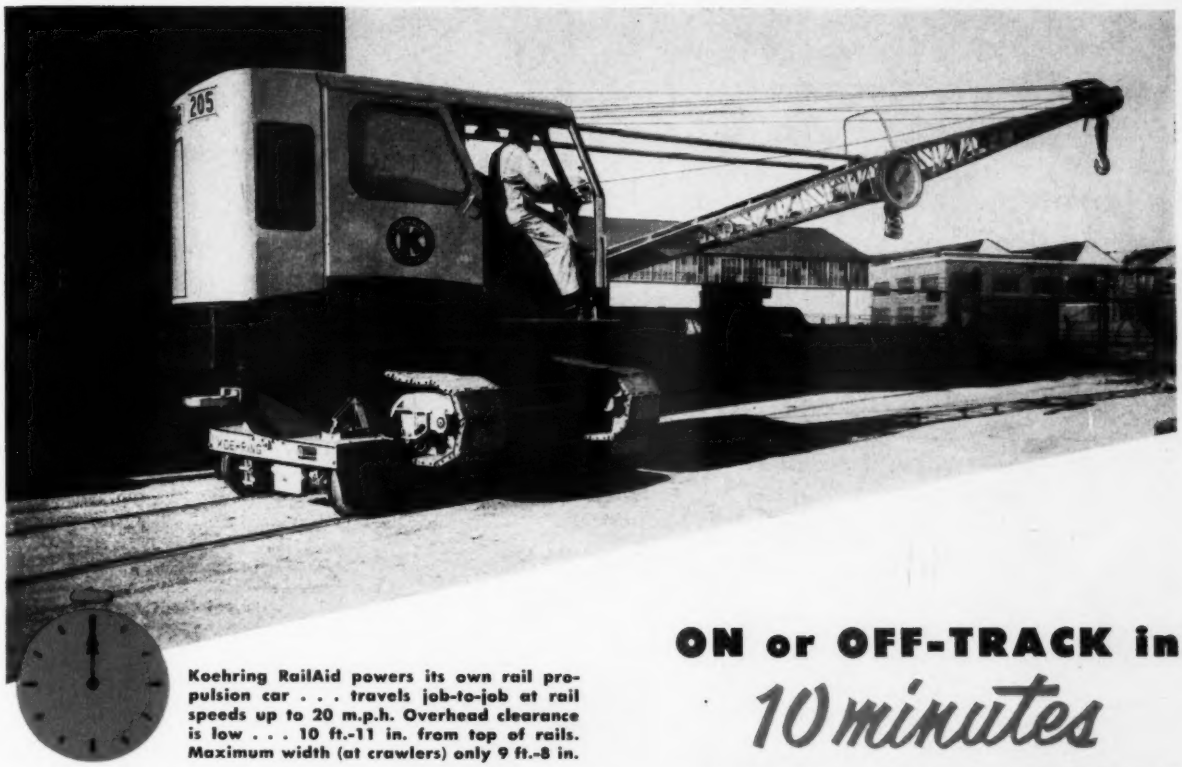
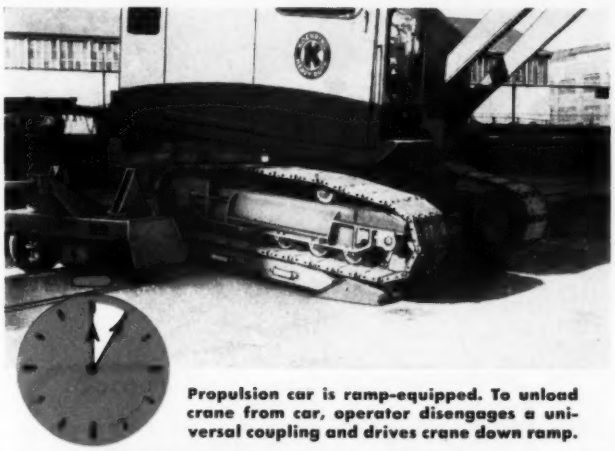
Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** – industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** – carbon dioxide, liquid-solid ("DRY-ICE") • **OHIO** – medical gases and hospital equipment • **NATIONAL CARBIDE** – pipeline acetylene and calcium carbide • **COLTON CHEMICAL COMPANY** – polyvinyl acetates, alcohols and other synthetic resins.



Koehring RailAid powers its own rail propulsion car . . . travels job-to-job at rail speeds up to 20 m.p.h. Overhead clearance is low . . . 10 ft.-11 in. from top of rails. Maximum width (at crawlers) only 9 ft.-8 in.



Propulsion car is ramp-equipped. To unload crane from car, operator disengages a universal coupling and drives crane down ramp.

Crane lifts its propulsion car off the track . . . clears the right-of-way for uninterrupted rail traffic. Entire loading or unloading operation takes less than 10 minutes!

ON or OFF-TRACK in *10 minutes* with Koehring RailAid®

Koehring heavy-duty RailAid combines all the advantages of a self-propelled track crane with the flexibility of a free-moving, off-track crawler crane. The crane works on or off the propulsion car . . . safely lifts 6.9 tons on the car . . . 8.9 tons on the ground.

RailAid travels at rail speeds up to 20 m.p.h. forward and reverse . . . is self-powered through extended lower traction shaft of crane and universal coupling on rail propulsion car. Crane loads or unloads itself on ramp-equipped car in less than 10 minutes. It sets car on and off-track . . . clears the rails for normal traffic. Work of crane and the road crew is uninterrupted during the complete shift.

Usefulness is unlimited . . . RailAid loads and unloads materials in yards and along the line, lays rails, places timbers and trusses on bridge construction and repairs, speeds scrap handling and salvage. Readily converts to magnet crane, pile driver, clamshell, dragline, ½-yard shovel or hoe.

K455RTS

KOEHRING COMPANY, Milwaukee 16, Wis.

Send us more information on Koehring RailAid.

NAME.....

TITLE.....

COMPANY.....

DIVISION.....

ADDRESS.....

where work's the hardest . .

. . . where loads are the heaviest . . . crews the largest . . . that's where you'll find Fairbanks-Morse Motor Cars turning in records of performance, economy and safety.

Take the Model 53 for example. The capacity of this standard section car accommodates full crew and equipment for all track maintenance jobs, yet is light enough for a minimum crew to set-off and handle.

Hauling trailers of ties and track equipment is a heavy job. The Model 53, with its famous F-M air-cooled clutch, can start and pull these heavy loads without damage. Continued slipping in this clutch cannot cause overheating or damage. With either Chain Drive or V-Belt Drive, clutch wear is negligible.

Add the F-M performance-proved features of sturdy steel frame—four-wheel self-centering brakes—rugged, powerful two-cycle engine—grouped controls and full visibility—and you'll see why F-M motor cars set the standard of performance where the jobs are the toughest. Fairbanks, Morse & Co., Chicago 5, Illinois.

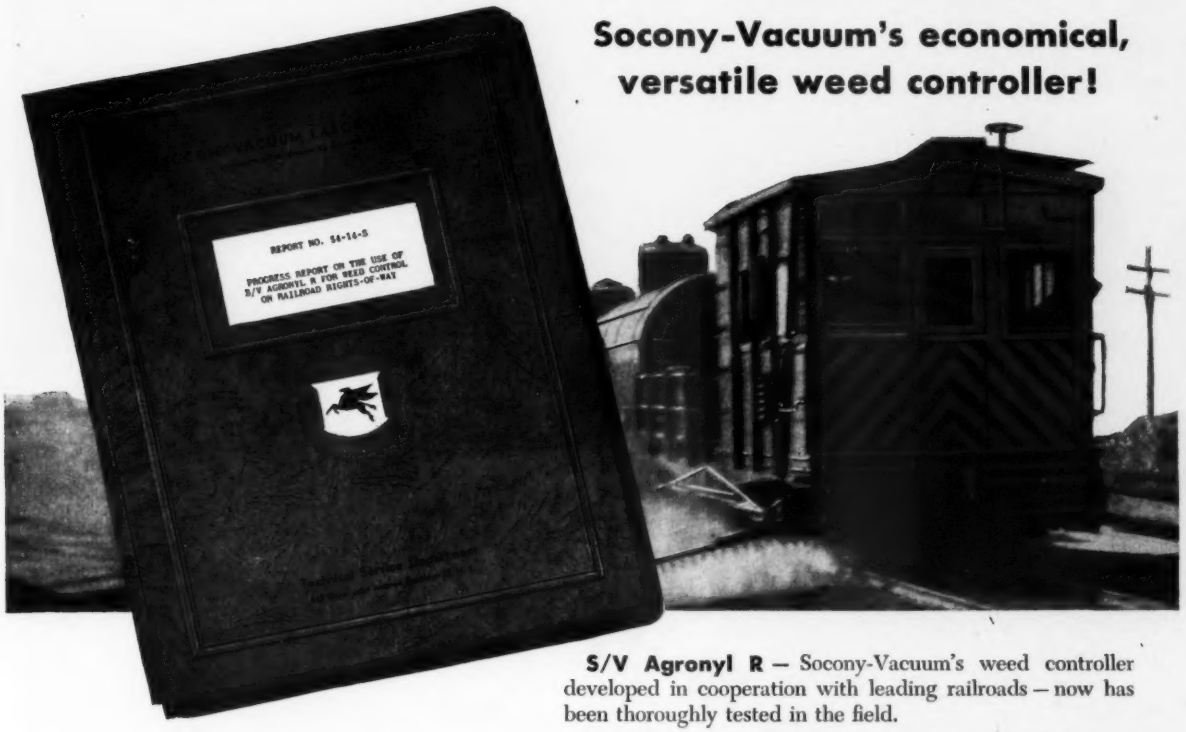
FAIRBANKS-MORSE

a name worth remembering when you want the best

RAIL CARS AND RAILROAD EQUIPMENT • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • PUMPS • SCALES • WATER SERVICE EQUIPMENT • HAMMER MILLS • MAGNETOS

PROGRESS REPORT ON S/V AGRONYL R

Socony-Vacuum's economical, versatile weed controller!



S/V Agronyl R — Socony-Vacuum's weed controller developed in cooperation with leading railroads — now has been thoroughly tested in the field.

Last year it was used by 14 railroads on rights-of-way as far apart as the Gulf of Mexico and the Canadian border. Thus, users had an opportunity to observe *S/V Agronyl R* under practically every kind of climate condition and on all typical roadbed vegetation in this wide area.

The results are now available in our Technical Service Laboratory Report No. 54-14-S . . . "Progress report on the use of *S/V Agronyl R* for weed control on railroad rights-of-way." This is the most complete summary of data ever compiled on the correct application of herbicidal oil to assure effective weed control.

Copies of Report No. 54-14-S are available to all railroad chief engineers and their staffs. Personal consultations regarding results covered by the report, and their application to your problems, will be arranged without obligation. Simply write us, or call your Socony-Vacuum representative.

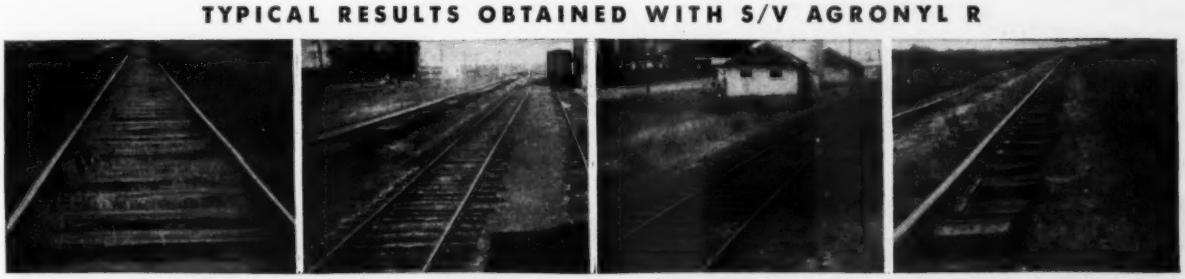
Railroad Lubricants

Socony-Vacuum Oil Co., Inc.

RAILROAD DIVISION

26 Broadway, New York 4, N. Y.
59 East Van Buren Street, Chicago 5, Ill.

TYPICAL RESULTS OBTAINED WITH S/V AGRONYL R



Four-week hold-down, Alabama

Seven-week hold-down, Central Illinois

Nine-week hold-down, So. Minnesota

Ten-week hold-down, Oklahoma

Dow

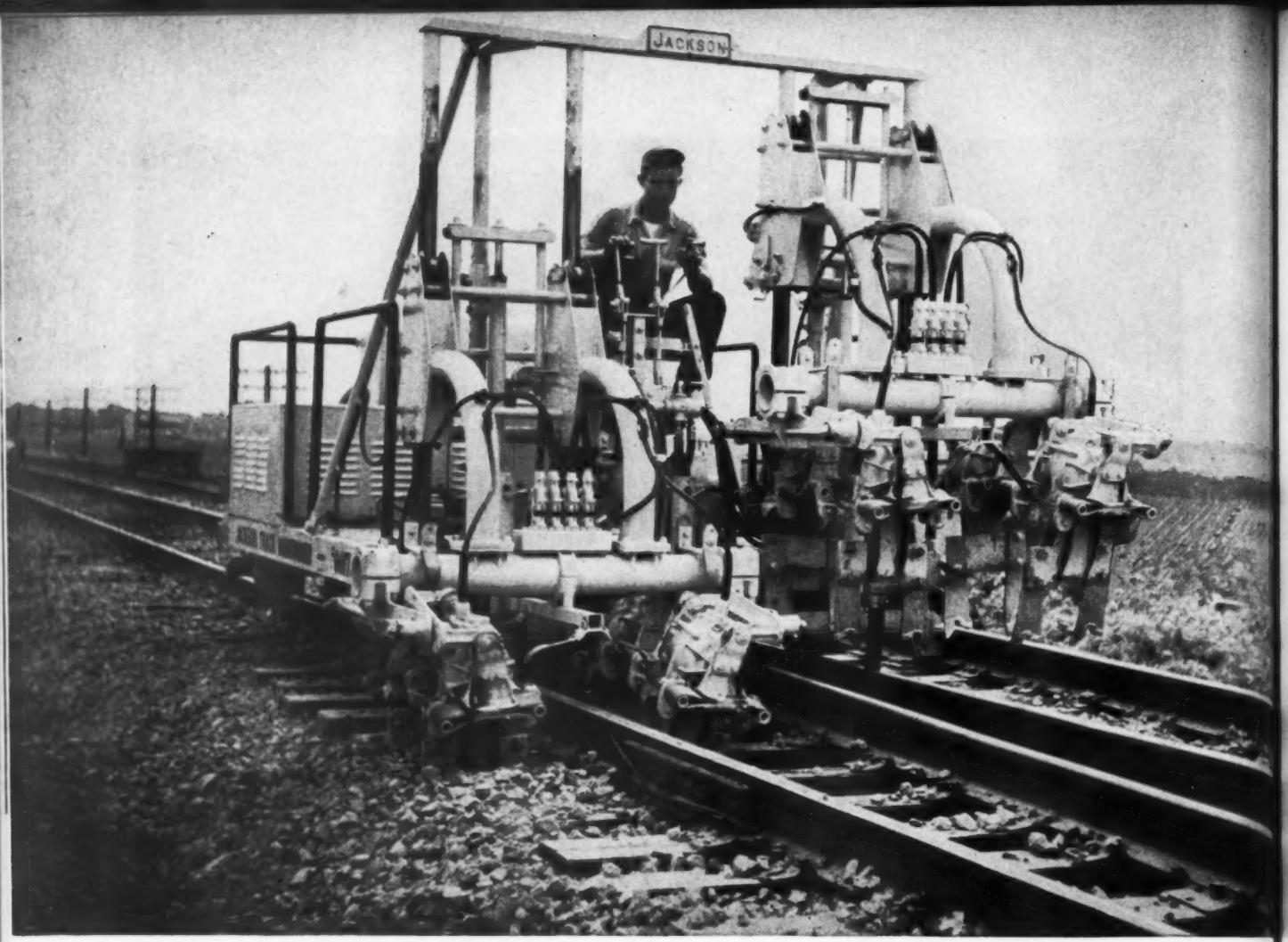
. . . smooth wheeling at eighty per!

DOW
weed and grass killers keep roadbeds clean . . . brush killers clear right-of-way

Yes, a smoother, safer ride for passengers and crew—because spraying with Dow weed and grass killers maintains mile after mile of *clean* ballast and berm. Roadbeds kept free of weeds and grass eliminate the hazard of churning track. Right-of-way sprayed for weed, brush and grass control looks neat and is economical to maintain. Railroad men charged with keeping service up and operating costs down can profitably use Dow herbicides.

Dow solved vegetation problems with the right chemicals for specific railway jobs. A "chemical crew" of weed, brush and grass killers works together or separately to hit your weed target like a shot. *New* Dalapon Sodium Salt 85%, a systemic grass killer, should be combined with Dow 2,4-D weed killers to control grasses and broad-leaved weeds in roadbeds. Esteron® Brush Killer controls brush by foliage spraying, and Esteron 245 gives effective year-around basal bark and stump control. Esteron Ten-Ten controls annual and perennial weeds and 2,4-D-susceptible brush. Where an amine formulation is preferred to an ester —2-4 Dow Weed Killer, Formula 40 is widely used. Your inquiries are invited. Technical information and assistance is available. THE DOW CHEMICAL COMPANY, Agricultural Chemical Sales Department, Midland, Michigan. In Canada: Dow Chemical of Canada, Limited, Toronto, Canada.

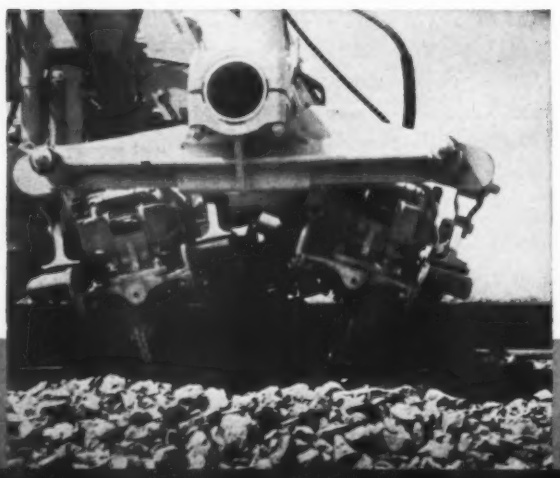
you can depend on DOW AGRICULTURAL CHEMICALS Dow



FOR BOTH BUILDING AND MAINTAINING FINEST TRACK AT LOWEST COST

JACKSON TRACK MAINTAINER

No other machine comes close to rivaling the JACKSON TRACK MAINTAINER's ability to handle ALL tamping jobs with topnotch efficiency — regardless of conditions involved. Careful investigation, we believe, is bound to convince you that, judged from any angle, this is THE machine for the over-all job of both putting up and maintaining track of highest quality. Write for descriptive folder. Wire or phone for the answers to any specific questions you may have.



Any kind and size of ballast is uniformly and firmly tamped in any lift, and in spotting and smoothing. The bars go way down and compact a perfect base for the tie that stays put.

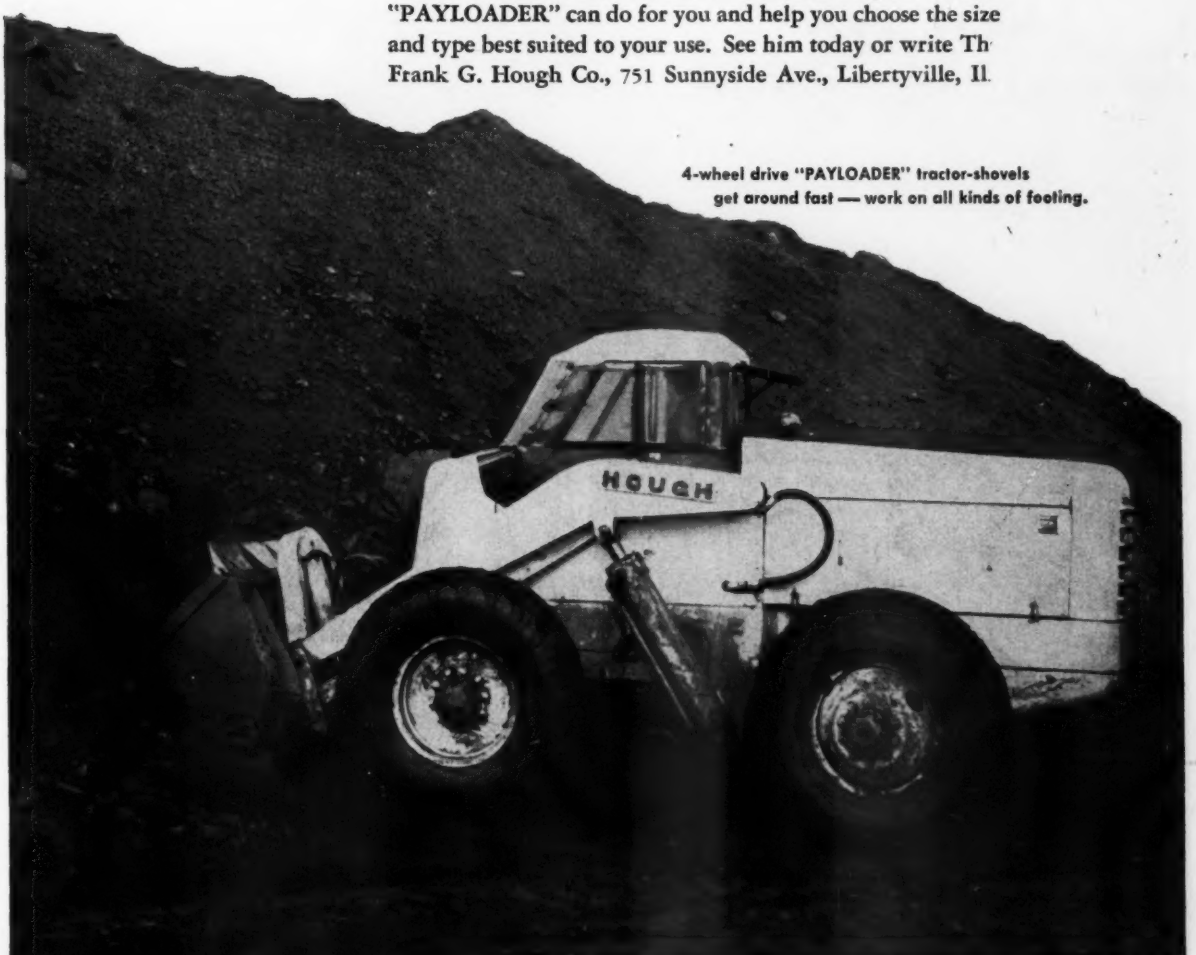
JACKSON VIBRATORS, INC.

LUDINGTON, MICHIGAN

PAYLOADER®...
the proven tractor-shovel!

- ***PROVEN EXPERIENCE*** — 34 years of pioneering and building hydraulic tractor-shovels — more experience than all others combined.
- ***PROVEN PERFORMANCE*** — 90% of the thousands of "PAYLOADER" tractor-shovels built in the last 15 years are still in service.
- ***PROVEN SERVICE*** — Some 300 "PAYLOADER" Distributors maintain millions of dollars of parts and service facilities for their customers.

Your "PAYLOADER" Distributor is anxious to prove what a "PAYLOADER" can do for you and help you choose the size and type best suited to your use. See him today or write Th Frank G. Hough Co., 751 Sunnyside Ave., Libertyville, Il

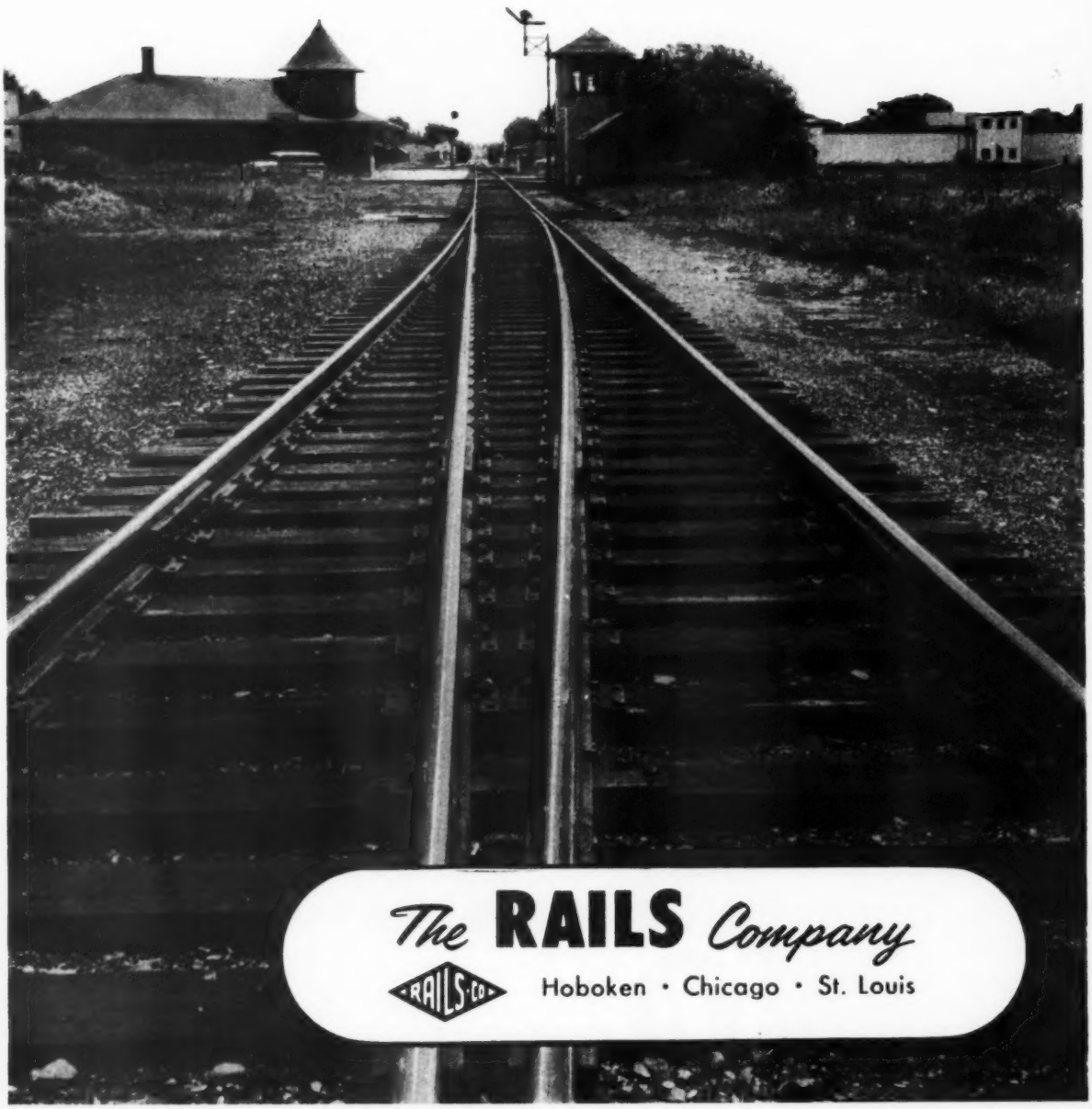


4-wheel drive "PAYLOADER" tractor-shovels get around fast — work on all kinds of footing.

PAYLOADER®
THE FRANK G. HOUGH CO. · LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Safe Economical HOLDING For CTC Territory . . .

The economical, two-way holding of COMPRESSION Rail Anchors is a prime consideration in track layouts for CTC. Signal failures due to running rail are prevented because COMPRESSION-held rail can not move in either direction—a "must" in any remote control installation.



The RAILS Company

RAILS CO

Hoboken • Chicago • St. Louis

There's always work for Atlantic Coast Line's CAT* Motor Grader

In the picture, the No. 12 Motor Grader is maintaining right-of-way near Rocky Mount, N.C., for Atlantic Coast Line. Tomorrow it may have a far different job.

For Caterpillar Motor Graders are rugged, versatile off-track machines. They are valuable all-around equipment on new construction, and can be used for keeping right-of-way clean, or reshaping slopes and drainage ditches. When winter moves in, the motor grader becomes a hard-working snow removal unit.

But, just as important as the *number* of jobs this big yellow machine does, is the *quality* of its work. Your operators can tell you. They know that Caterpillar Motor Graders make it easy for them to do a thorough job.

For one thing, the engine can be started from the seat. Constant-mesh transmissions make shifting easy. The operator has excellent visibility sitting down. Anti-coast brakes prevent blade creep under load—the blade stays where the operator puts it.

The proof of these machines is in their performance. That's why your Caterpillar Dealer is ready to demonstrate any of his three models on your job. Call him today and name a date for your demonstration.

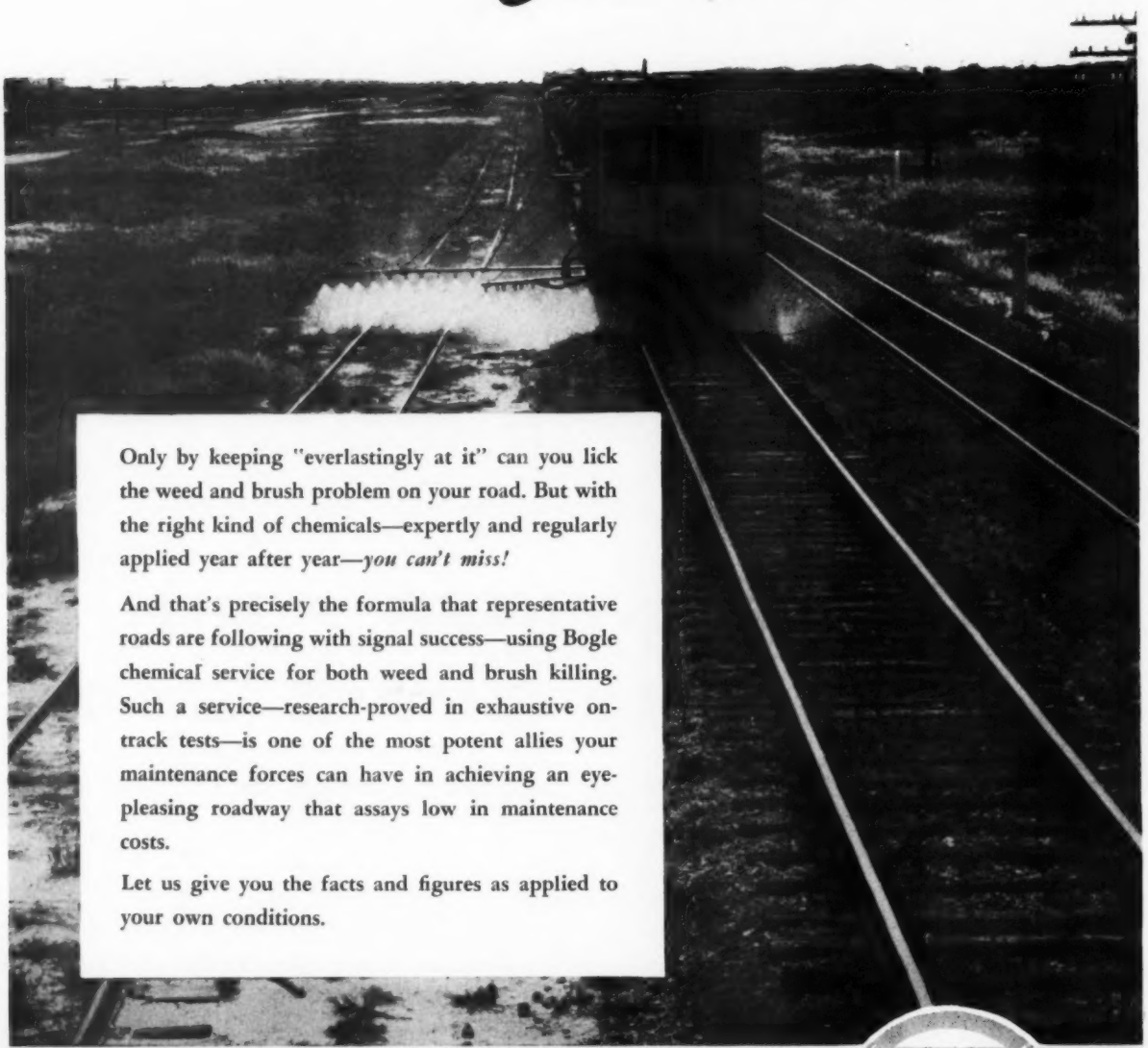
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

TOUGH JOBS ARE CATERPILLAR JOBS

IT PAYS OFF IN LOWERED MAINTENANCE COSTS *Every Time*



Only by keeping "everlastingly at it" can you lick the weed and brush problem on your road. But with the right kind of chemicals—expertly and regularly applied year after year—*you can't miss!*

And that's precisely the formula that representative roads are following with signal success—using Bogle chemical service for both weed and brush killing. Such a service—research-proved in exhaustive on-track tests—is one of the most potent allies your maintenance forces can have in achieving an eye-pleasing roadway that assays low in maintenance costs.

Let us give you the facts and figures as applied to your own conditions.

The R. H. BOGLE Company

ALEXANDRIA, VA.

Memphis, Tenn.

COMPLETE WEED and BRUSH KILLING SERVICE

How to protect your biggest track investment: *straightaways*

This fine stretch of track handles high-speed, high-density traffic and heavy tonnage, yet cross tie costs are at a minimum, thanks to Burkart Tie Pads.

Records show that spike lifting and the need for tamping, regauging and general maintenance have been so materially reduced that the pads have paid for themselves many times over.

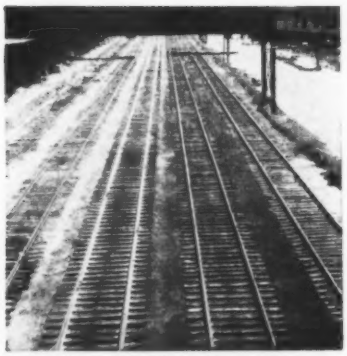
You can effect the same savings on *your* straightaways or anywhere your track maintenance costs are high. For complete information write:

THE BURKART TIE PAD
with the permanent seal

F. BURKART MFG. CO.,
Railroad Tie Pad Div., Division of Textron, Inc.
4900 N. Second St., St. Louis 7, Mo.

Weed and Brush Control lasts longer with Du Pont TELVAR® and AMMATE®

Weed Killers — *Weed and Brush Killer*



"Telvar" has kept this yard clean of vegetation for two years.

Track at right was treated with "Telvar" Weed Killer. "Telvar" won't corrode equipment; it's non-flammable, non-volatile.

Area treated with "Telvar," left; untreated, right. "Telvar" is easily applied, extremely low in toxicity to humans and animals.

One application of "Telvar" solves weed problems for a season or longer!

"Telvar" kills through the roots . . . prevents regrowth. Low dosages (20 to 80 lbs. per acre) make it cost little for the results you obtain. Low rates also mean less handling, less storage facilities. If you're looking for a way to cut maintenance costs to new low levels, include "Telvar" in your weed-control program. Available in two formulations: "Telvar" W; and "Telvar" DW, which is especially suited for light, sandy soils and in areas where annual rainfall is higher than 20 inches.

"Ammate" kills more kinds of brush and keeps it down longer than most weed and brush killers!

When the original spray job is well done, brush is kept under control with nothing more than an occasional spot spray later. You can rely on "Ammate" to do the job safely, even where your rights-of-way adjoin crop land, because "Ammate" is not volatile. There are no vapors to drift onto sensitive crops.

FREE ILLUSTRATED BOOKLETS describe how to control weeds and brush with Du Pont chemicals. For your copies, write to Du Pont, Grasselli Chemicals Dept., Rm.D-4032, Wilmington, Del. In Canada—Du Pont Company of Canada Limited, Box 660, Montreal.

TELVAR® AMMATE®

Weed Killers — *Weed and Brush Killer*

On all chemicals always follow directions for application. Where warning or caution statements on use of product are given, read them carefully.

DU PONT

Reg. U.S. Pat. Off.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Brush along right-of-way was controlled with "Ammate."

Maintenance crews prefer "Ammate" because they can use it without hazard to themselves, livestock, wildlife or adjoining crops.

Same right-of-way as above, three years after treatment. Brush still under control; low-growing cover returned to resist erosion.

Quality

GAGE and LINE go "hand in hand"

. . . get better riding track with these 2 NORDBERG *"Mechanical Muscles"®*

● *With the Nordberg Dun-Rite,* the gaging operation follows right behind the Adzers and fastens the tie plates to the ties in exact position, so that when the rail is placed the head-to-head gage is correct. The Dun-Rite method is base gaging and it is actually the outside shoulder of the tie plate which is gaged. *Write for Bulletin 220.*

With the self-contained, self-propelled Nordberg Trakliner, you can line track in connection with track raising, spot surfacing, new work or improvement programs at amazing savings. The Trakliner uses easily controlled hydraulic power to line the track any desired amount. Two men and the Trakliner will line all the track a gang can raise or spot surface in a day. *Write for Bulletin 230.*

Many major roads have proved that these two sets of Nordberg "Mechanical Muscles" have given them better gage, better line and hence better track—at appreciable savings in time and maintenance dollars . . . another example of the advantages you get by using Nordberg Track Machinery.

USE NORDBERG *"Mechanical Muscles"®* TO DO A BETTER, FASTER MAINTENANCE JOB AT LOWER COST

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ADZING MACHINE • BALLAST ROUTER • CRIBEX • BALLASTEX • SCREENEX • HYDRAULIC & MECHANICAL SPIKE PULLERS • SPIKE HAMMER • TIE DRILL • POWER JACK • POWER WRENCH • RAIL DRILL • RAIL GRINDERS • TRACK SHIFTER • DSL YARD CLEANER • TRAKLINER • DUN-RITE GAGING MACHINE • GANDY—TIE PULLER and INSERTER

NORDBERG MFG. CO., *Milwaukee, Wis.*

NORDBERG MACHINERY

"These weeds tickle, George . . . next time let's ride a railroad that uses Chipman weed killers."

Chipman Chemical Company weed killers and application service are backed by over 40 years of experience in serving railroads. An extensive line of weed, grass and brush killing chemicals is available to meet varying conditions. Included are the following:

Atlacide Liquid	Methoxone-Chlorax
Atlacide Spray Powder	Atlas "A" Arsenical
Chlorax Liquid	Atlas Contact
Chlorax "40"	Brush Killer
TCA-Chlorax	Borax • CMU • Dalapon

Let us solve *your* weed problems with the *right* chemicals and application service.

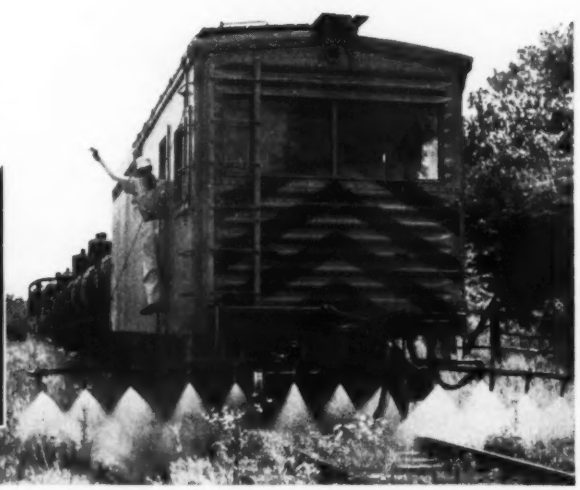
CHIPMAN

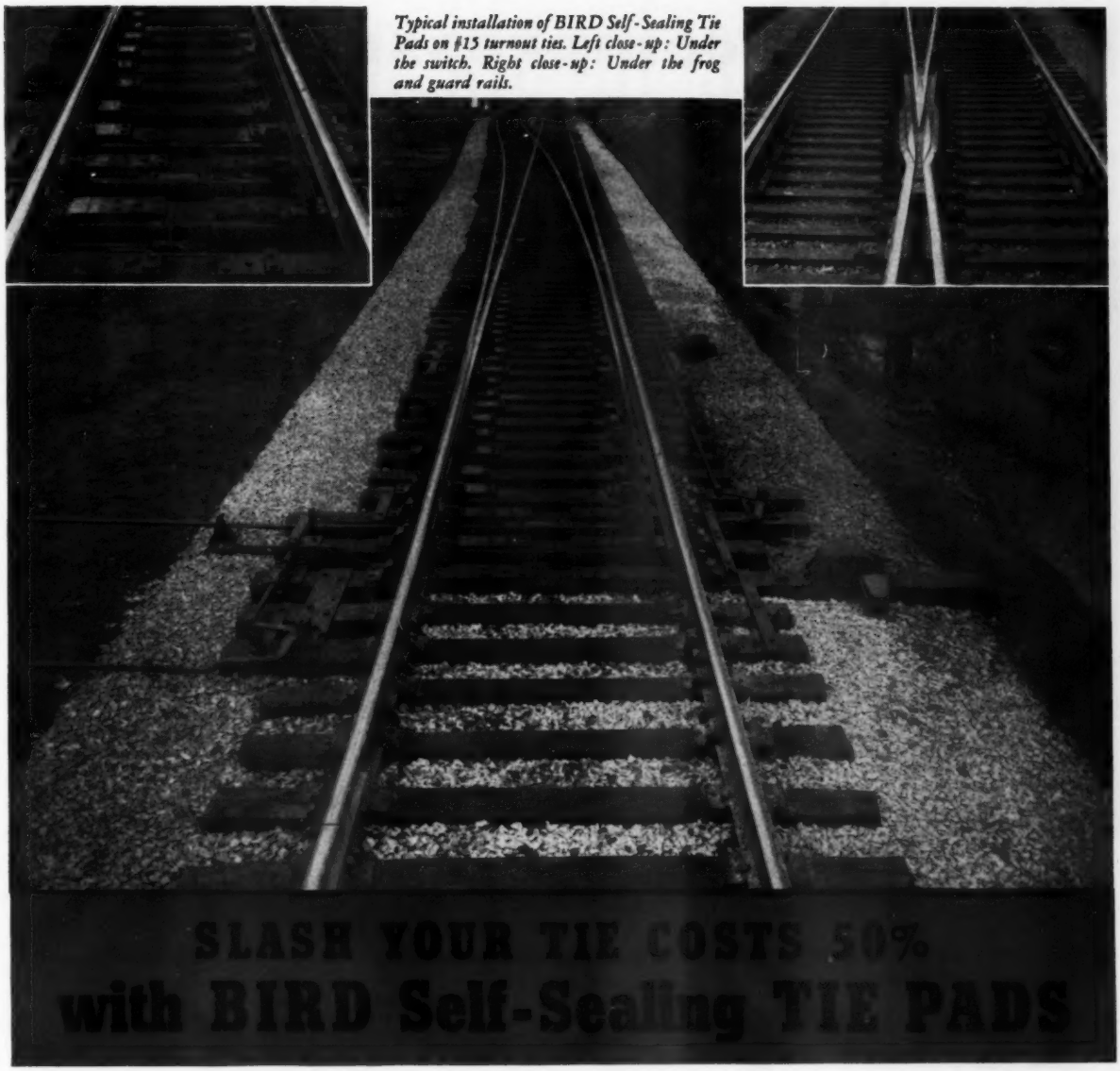
Chemical Company, Inc.

Railroad Div. Headquarters: 608 So. Dearborn St., Chicago 5

Executive Offices: Bound Brook, New Jersey

16 Strategically Located Chipman Plants





Typical installation of BIRD Self-Sealing Tie Pads on #15 turnout ties. Left close-up: Under the switch. Right close-up: Under the frog and guard rails.

SLASH YOUR TIE COSTS 50% with BIRD Self-Sealing TIE PADS

HOW? BIRD Self-Sealing Tie Pads form a waterproof, dustproof seal on the tie that protects the vulnerable area under the plates and around the spikes. Mechanical wear and plate penetration are eliminated.

YOU GET 50% or more extra tie life from new ties and timbers.

YOU GET twice the normal remaining life expectancy from old ties that can be adzed to a smooth surface of sound wood.

YOU SAVE on gauge, line, and surface costs in addition to savings on tie life.

BIRD PROVEN BEST! The original self-sealing tie pad – proven by years of in-track experience.

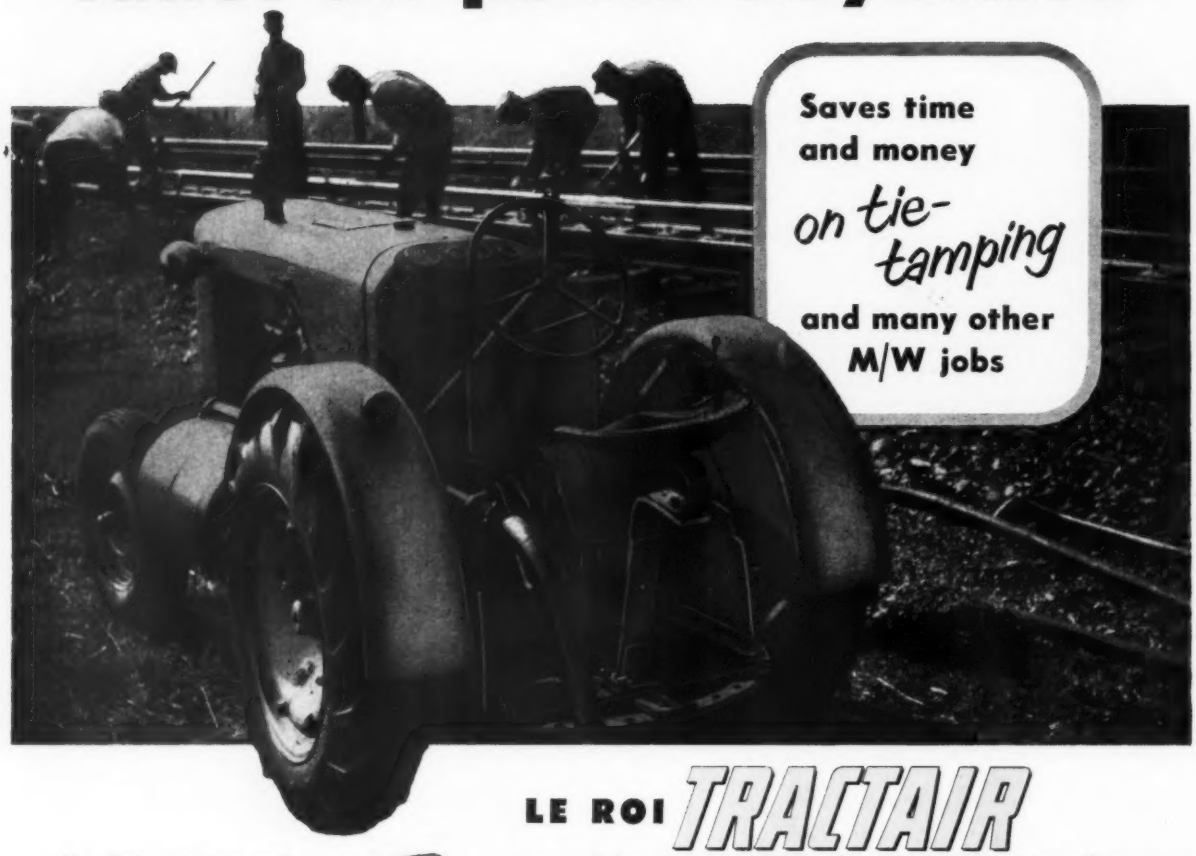
WHERE?

1. On the joint and shoulder ties of insulated joints.
2. On new or older bridge decks.
3. On switch timbers.
4. Under crossing frogs.
5. Through highway grade crossings and station platforms.
6. On curves to insure holding track to gauge and surface.
7. With smaller tie plates.
8. On pile cutoffs.

WHEN? Start now. Write today to BIRD Tie Pads, Dept. HTS-2, East Walpole, Massachusetts.

BUY THE BEST **BIRD & SON, inc.** Established 1795 ***BUY BIRD***

Off-track compressor-tractor takes air power anywhere



LE ROI TRACTAIR

provides versatility for extra hours of usage

TRACTAIR'S low-cost, mobile air power lets you make more use of work-saving CLEVELAND air tools. For example, Tractair delivers enough air to run eight standard tie tampers —helps your section hands tamp fast and uniformly.

By using other attachments, your men multiply Tractair's usefulness. They can use it to lift, load, auger, mow, backfill, power a winch, plow snow, and do the work of other specialized equipment.

Yes, sir, this combination 105-cfm compressor and 35-hp tractor is adaptable to many M/W jobs. It has good traction and low center of gravity—can be driven almost everywhere. It readily crosses or straddles heavy-duty rail. It climbs embankments and works on a two-to-one slope with safety.

We'd like to show you Tractair at work, so you can get a first-hand picture of its money-saving usefulness. Just write and tell us when it's convenient. And—ask for job-data sheets and bulletins.

Do all these jobs — and more — with Tractair:

- Tamp ties; drive spikes.
- Break pavement.
- Drive mail point for grouting operation.
- Do ditching, light grading, weed mowing.
- Drive earth augers.
- Stockpile ballast, cinders, other materials.
- Handle off-season work for B&B, Signal, T&T, and Water-Service Departments.

CLEVELAND No. 10 Tie Tamper, shown at right, weighs only 36 lbs. Section hands like it and can handle it without tiring. The work is faster and more uniform.

LE ROI — Division of Westinghouse Air Brake Co.
Milwaukee 14, Wisconsin

PORTABLE AIR COMPRESSORS • TRACTAIR • STATIONARY AIR COMPRESSORS • ENGINES • AIR TOOLS • TRUCK MIXERS • FRONT-END LOADERS

Tractair operates air-motor-driven auger up to 16" diameter. Hydraulic control keeps auger at desired angle. Horizontal auger also available.

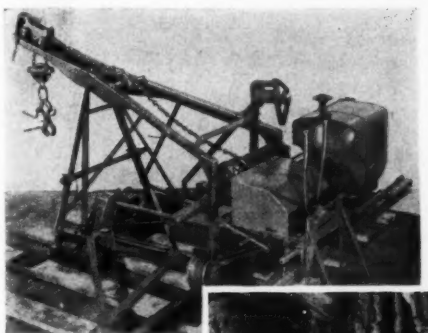
Front-end loader is attached to Tractair in only a few minutes, cuts the cost of handling ballast, cinders, other materials.

A backfill blade adapts the versatile Tractair for such jobs as filling trenches, light grading, and other light dozing work.

prolong the life of switch rails!

the MACK Reversible Switch Point Protector

Prolongs the life of a switch rail about 4 times that of an unprotected switch rail. Then the Mack Protector is removed, reversed, and reapplied to extend the life of the switch rail a similar period—making the switch rail last about 8 times that of an unprotected switch rail.



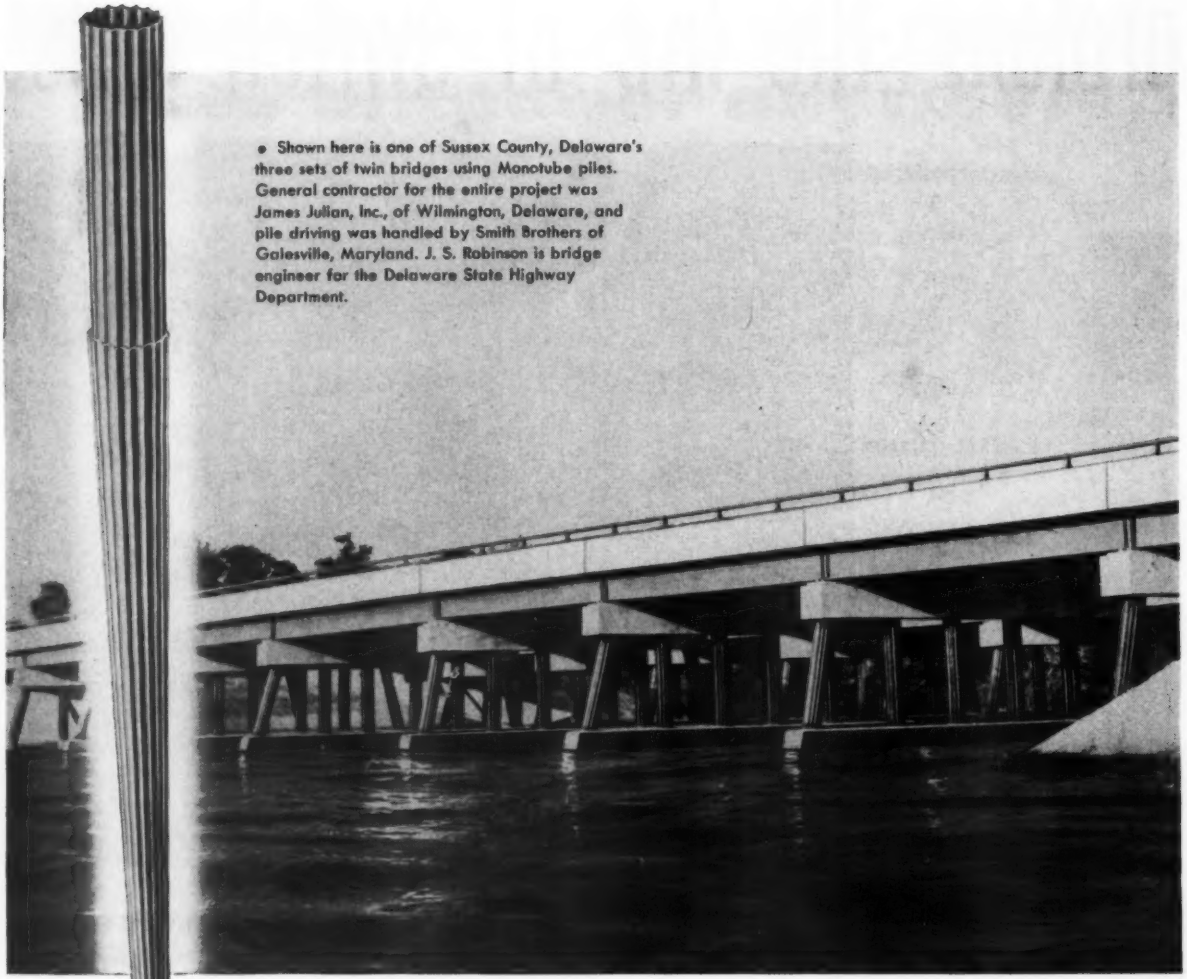
MECO POWER RAIL LAYER — Lays standard rails, long rails, and continuous welded rail *fast* at low cost, with a comparatively small gang.

MECO CURVE RAIL LUBRICATOR—Greases rail and wheel flanges, reducing friction and making curves safer for modern trains.

Maintenance Equipment Company
RAILWAY EXCHANGE BUILDING • CHICAGO 4, ILLINOIS

TYLIFE improves track structure . . . increases tie life . . . provides greater holding power in cross-ties and bridge timber . . . reconditions old spike-worn holes . . . reduces labor of re-gauging and re-spiking.

G 656R



• Shown here is one of Sussex County, Delaware's three sets of twin bridges using Monotube piles. General contractor for the entire project was James Julian, Inc., of Wilmington, Delaware, and pile driving was handled by Smith Brothers of Galesville, Maryland. J. S. Robinson is bridge engineer for the Delaware State Highway Department.

Monotube Piles offer dual economy for Twin Delaware Bridges

LOOK how tapered, fluted Monotube steel piles are used both as rugged foundation piles and as unsupported trestle columns for these twin bridges over Delaware's Nanticoke River. This construction takes advantage of Monotube's versatility . . . and saves plenty compared with the alternate method requiring concrete piers built in cofferdams.

Monotube piles have other advantages too. They're cold-rolled for added strength, save time and money because of easy on-the-job extension welding, cut-offs are quick and easy, no need for special rigs or heavy driving equipment, and there's top-to-bottom visual inspection before concreting.

These important features explain why so many experienced contractors and engineers prefer Monotube piles for foundation jobs of every description. Write today to The Union Metal Manufacturing Company, Canton 5, Ohio, for your copy of Catalog No. 81.

Monotube Foundation Piles

UNION METAL

RUST-OLEUM

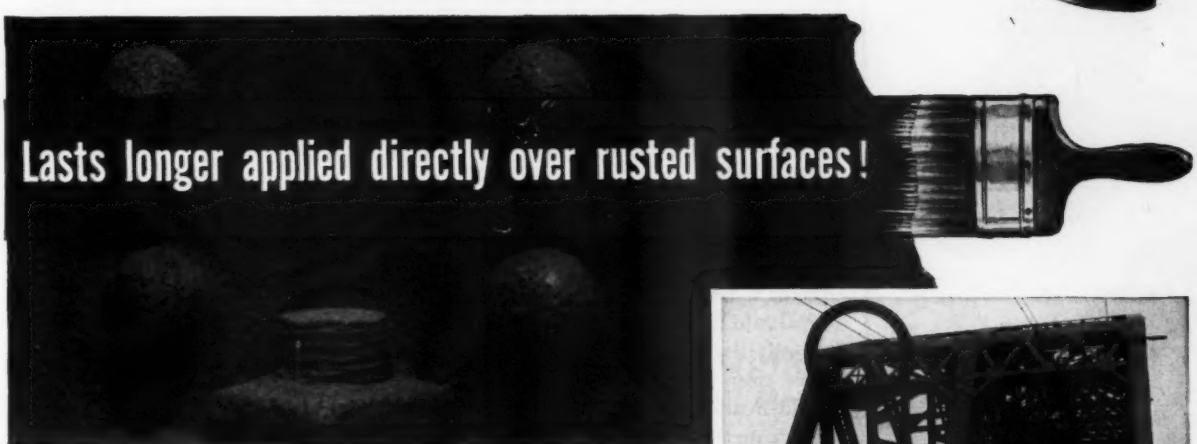
STOPS RUST!

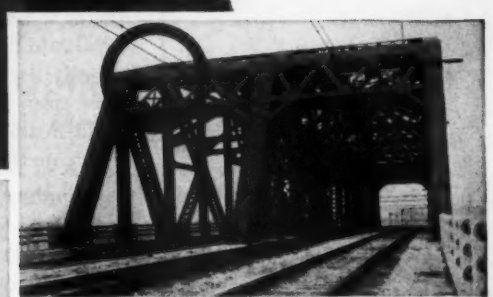
Cut Your Maintenance Costs On Signalling Equipment, Rolling Stock, Bridges, Towers, Tanks, etc.

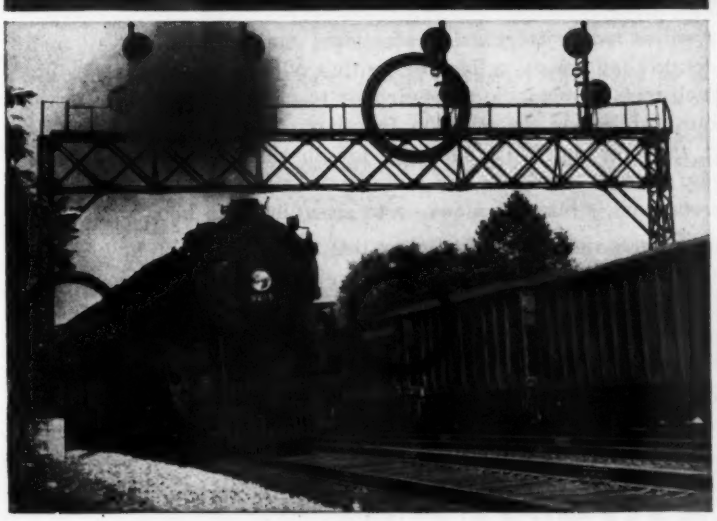
Here's the *practical, sensible* answer to your rust problems! Costly sandblasting or chemical precleaning are not usually required . . . just wirebrush and scrape to remove rust scale and loose particles . . . then apply RUST-OLEUM by brush, dip, or spray over the rusted surface. Dries to a tough, elastic, rust-resisting film that lasts longer applied over rusted areas. So easy to use that one man often does the work of two . . . saves you time, labor, and money. Get the complete story from your RUST-OLEUM Rust Preventive Railroad Specialist today!

RUST-OLEUM CORPORATION
2546 Oakton Street, Evanston, Ill.

Available In All Colors, Aluminum and White







Request Your FREE Copy of The RUST-OLEUM Railroad Catalog Now!

RAILWAY

TRACK and STRUCTURES

Subject:

Dear Readers:

Reader Confidence

People who are in the business of producing something for sale—which means just about all of us—can never permit themselves to forget that they must gain and hold the confidence of their customers. Whenever you make a purchase, whether it be a hamburger sandwich or a house, you are expressing a degree of confidence in the seller. On the other hand when a trucker or shipper elects to use railroad service he is expressing confidence in the ability of you and your associates to furnish safe, dependable and economical service.

A magazine, too, must have the confidence of its customers, meaning both the people who read it and those who use it as an advertising medium. For paid-circulation magazines, such as this one, it is particularly important to have the confidence of the reader. Obviously, you would not continue to pay cash for a publication if you found it to be habitually unreliable in reporting or interpreting developments of vital interest to you. Looking at the matter from our side of the fence, it is apparent that we cannot afford to lose your confidence, for that would undoubtedly mean that eventually we would also lose your business.

You can understand, therefore, why it is that this consideration underlies our entire editorial policy. This policy, in a nutshell, is to bring to you, month after month, information on interesting and significant developments in your field, concisely written in your language and attractively presented.

This task is complicated by the fact that the field is highly specialized. For this reason our staff is composed entirely of men who have had years of practical experience in railway engineering and maintenance work. With a background of such experience our editors are in a position to evaluate developments in terms of their importance to *you*; they are able to sift the unusual from the usual, the significant from the insignificant, and they are equipped to judge, weigh and interpret happenings in the field in the same manner as you would if you were free to travel and inspect methods and practices on other roads.

In other words our editors are professional maintenance-of-way men who have found they possess a flair for writing. With the expert reporting of which such men are capable we endeavor to win and hold your confidence in our publication. In addition to other considerations governing their work, they recognize the necessity for absolute accuracy, and this explains why there is much wailing and gnashing of teeth when, in spite of every precaution, a mistake manages to creep into the book.

This discussion naturally leads up to this question: Just how much confidence do you have in this magazine? The most reliable measure that I know of is the extent to which you renew your subscriptions annually. The latest statement of the Audit Bureau of Circulations shows a renewal rate for this magazine of 85.82 per cent.

While pointing out that this rate is unusually high I hasten to add that, even so, we are not satisfied with it. If in the future we can push it up only fractionally, that will be an indication that our efforts to do a better job are proving successful. You are the judges. MHD

The RACOR
SECURITY ADJUSTABLE RAIL BRACE

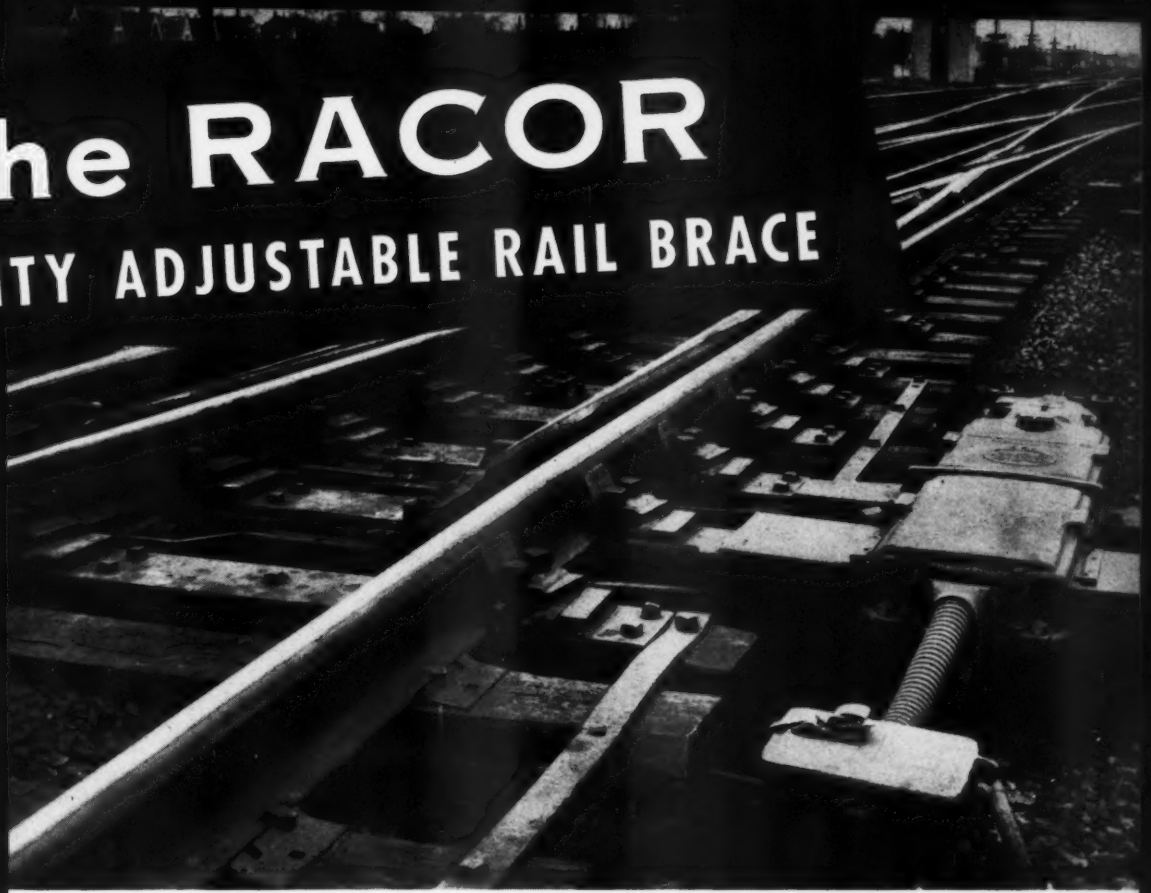


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FIGURE 3134-A (Patented)

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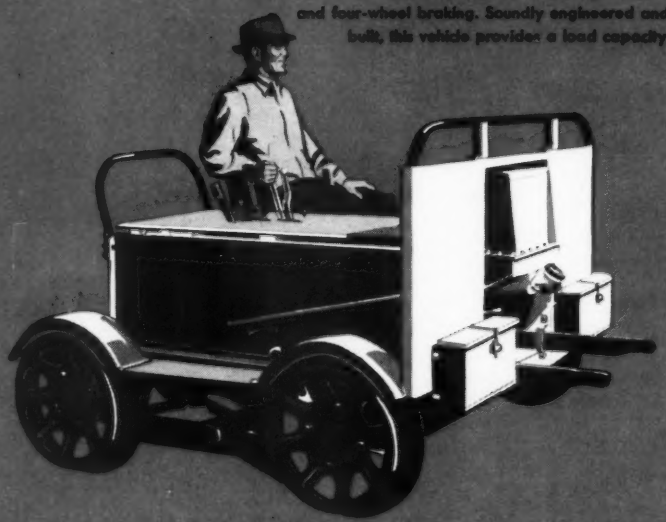

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RAILWAY

TRACK and STRUCTURES

February, 1955 **Vol. 51, No. 2**

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A luxury streamliner roars through the black, rainswept night at 80 miles an hour. Somewhere ahead there's a 40-mile curve. How much advance warning will the engineer have? Suddenly . . . a yellow flash far ahead . . . seconds later a legend "40" bright and clear. The throttle goes forward; the brakes take hold. The train eases smoothly and safely into the curve. How? Because the speedboard was reflectorized with "Scotchlite" Sheeting—the brilliant material that's visible at night ½ mile away. Why? Because this road's management felt that $4.98* was little enough to invest to keep its million-dollar trains on the track as well as on time.

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train on time...and on the track!

Why 15 Class 1 roads produce reflectorized signs with the central sign shop method

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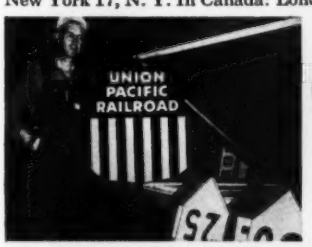

UNION PACIFIC operates this Central Sign Shop at Evanston, Wyoming

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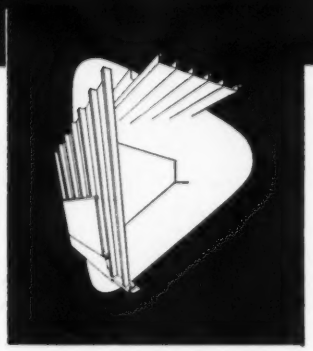


It Can Be Done!

Give a reasonably intelligent man sufficient incentive and he can overcome almost any obstacle. When such a person is confronted with a do-it-or-else situation it is surprising how the most difficult problems seem to dissolve into thin air, revealing one or more solutions that sometimes are amazingly simple.

Railway maintenance officers can certainly find in their own experiences many examples that illustrate the truth of these statements. Let's look at a few of them. There was, for instance, the matter of the 40-hr week. It seemed impossible to shift from the 48-hr to the 40-hr week without adding substantially to the labor force. Yet, so powerful was the incentive for economy that practically all roads were able to make the transition without adding to the pay roll, and many of them actually have a smaller m/w force now than they had before.

Then there is the matter of continuous rail. Because of locked-up stresses in long lengths of rail it would be impractical to perform essential maintenance tasks on such track in hot weather, or so it was said. Now, more and more roads are becoming convinced that this obstacle, and others associated with continuous rail, can be overcome in the interest of taking advantage of the economies of such rail.

Maintenance men are now confronted with problems that seem as impossible of solution as those cited above did at one time. One of the most important of these is presented by the restrictions imposed on the use of equipment by agreements with labor unions.

There is no thought of minimizing the difficult nature of this problem. It is so complex that the inclination is to take the position that we are "hooked" and nothing can be done about it. Yet its solution would open the way for very large economies in track maintenance. Why not take the attitude that this problem *can* and *must* be solved, and see what happens?

The Problem of Rail Testing

A score of years ago it was frequently predicted, following the advent of control-cooled rail, that the the need for rail testing would pass with the gradual elimination of non-control-cooled rail from the tracks of the railroads. Like so many predictions made under the glow of a panacea this proved incorrect.

As in medicine, with the discovery of a cure or control for an old ailment, new problems, like new diseases, rise to replace the old in importance. A symposium in the "What's the Answer" columns of this issue focuses attention on the problems in rail testing which have arisen since the advent of control-cooling.

The new types of failures, or the defects which cause them, do not follow the pattern of the transverse fissure, the occurrence of which could be tied to rails of a given heat. In a sense, therefore, the internal defects encountered today are even more insidious in their action because they cannot be predicted before service failures or testing of the rail disclose their presence.

As a result, present-day testing policies, as brought out in the symposium, are being shaped and established even more objectively than in the past. Specifically the effort is toward the optimum in testing frequency consistent with maximum safety and economy.

It is to be expected that the testing patterns developed by individual railroads will show wide variations because of important differences in traffic density, speeds of trains, the physical condition of the track (alinement and grade), etc. What the railroads are doing is to determine their individual testing policies on the basis of such data as the pattern of service failures, the rate of growth of detected defects, and "spot testing."

Unquestionably rail testing to uncover hidden defects is, and will continue to be, a necessary activity.

Scope of Great Northern's Sign Reflectorizing Program

SIGNS PRESENTLY BEING REFLECTORIZED

One mile station
Crossing whistle posts
Flangers
Stop (hand signs)
End automatic block
Car capacity
Stop
- Railroad crossing
- Junction
- Draw span

One mile to yard limit
Yard limit
Station sign
Test mile
Crossbucks (highway signs)
Advance warning (highway sign)
Railroad crossing one mile
Junction one mile
Draw span—300 feet
1000 foot tunnel
State line post
End double track
Speed limit
Portable train control
Temporary speed
Stop (highway sign)
Restricting
Mile post
Culvert number
Do not use sand (spring switch)
Centralized traffic control
GN emblem (for equipment)
Truck and bus stop
Restricted clearance (underpass protection)
Special highway crossing sign (highway)
Bridge number and stream sign
GN emblem and motto (for automobile underpasses)

SIGNS TO BE REFLECTORIZED

Mine name
Station name
Derail post
Tunnel number board
No trespass board
Snow-shed number
Stop engine
Eastward or westward siding
Restricted clearance
Danger inflammable material
No clearance
Warning underground cable

SIGNS WHICH WILL NOT BE REFLECTORIZED

Section limit board
Number post for industry site
Temporary track sign
Maintenance and ownership (3 types)
Trainmen's warning
Curve number and super elevation

TOTALS

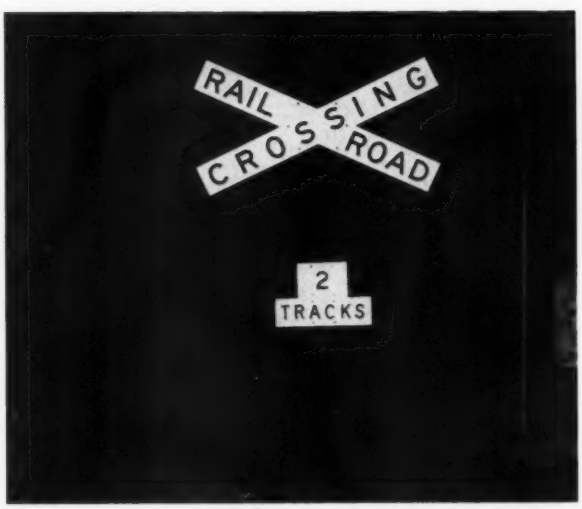
33 types of signs being reflectorized
13 types to be reflectorized
8 types will not be reflectorized

SPEED-CONTROL signs being reflectorized include the three solid panels—red for "stop," green for "resume speed" and yellow for "slow." Striped sign is used in speed restriction areas.

How Great Northern Is

Reflectorizing Wayside and Crossbuck Signs

CROSSBUCKS of type now used consist of steel posts and aluminum cross-blades covered with silver reflective sheeting.



NIGHT VIEW of sign shown at left. When seen in auto lights such signs are said to be 200 times brighter than white paint.

W. H. GORDENIER, Great Northern office engineer, points to reflective emblem in system sign shop. Emblem, which is used on cabooses, is made by silk-screening transparent colors on silver reflective sheeting. The various signs shown on table are made in a heat-vacuum applicator which bonds reflective sheeting to the metal sign backing.

All color photos courtesy Minnesota Mining & Manufacturing Co

● With safety and economy as the principal objectives the Great Northern is carrying out a system-wide program involving the reflectorization of all its crossbuck signs and over 90 per cent of all wayside signs.

In considering the two principal objectives of the program the railroad's reasoning went something like this:

Safety. Two facts encouraged the Great Northern to make its wayside signs brightly visible both night and day: (1) That man has always had trouble seeing in the dark and that high speeds make this human weakness more likely to be fatal; and (2) that twice as many motorists run into trains at night as in the daytime.

Economy. Reflectorization, Great Northern style, is considered cheaper than not reflectorizing; wayside signs and crossbucks are estimated to last two and three times longer than before and to require no field maintenance.

How Program Has Grown

The use of reflective sheeting began in 1947 for crossbucks and in 1945 for wayside signs, starting with yard limit and advance warning signs, followed by speed control signs in 1946 and 1947. Since then the practice has been extended to other signs.

Now, with 33 types of wayside signs being reflectorized (see tabulation) as they come due for replacement and 13 other types due for the same treatment and only 8 types not scheduled for it, the Great Northern has established a central sign shop in St. Paul to handle sign-reflectorization work for the entire system. Although the shop is hardly a year old, the road is already gradually abandoning sign painting in the field in favor of reconditioning all signs in the shop where the same work can be done less expensively and with better quality.

Four new factors have entered into the Great Northern's sign-making and reconditioning, all tending toward better signs at lower cost:

(1) The sign shop itself, by providing machine precision in the place of hand painting, assures a better quality which is expected to result in longer service life and lower cost per year.

(2) Reflective sheeting on the face of the signs, according to Great Northern officers, not only will make all wayside traffic-controlling signs visible at long distances at night, but will help provide two or three times longer service life—up to ten years of field life for the signs, compared with the present three or four years.

(3) Aluminum sign blanks are replacing wood and are expected to make the back of the sign last indefinitely, at the same time eliminating the need for painting it.

(4) Painted steel uprights to support the signs are gradually replacing wood posts and are also expected to last indefinitely, providing economy through durability. These will continue to be painted in the field by bridge and building crews in the course of regular maintenance. Only the sign faces are shipped to St. Paul for reconditioning.

Eventually, as old signs wear out, all of the traffic-controlling wayside signs on main lines are expected to be reflectorized with "Scotchlite" reflective sheeting, making them recognizable to locomotive engineers at night hundreds of feet before non-reflective signs can even be seen.

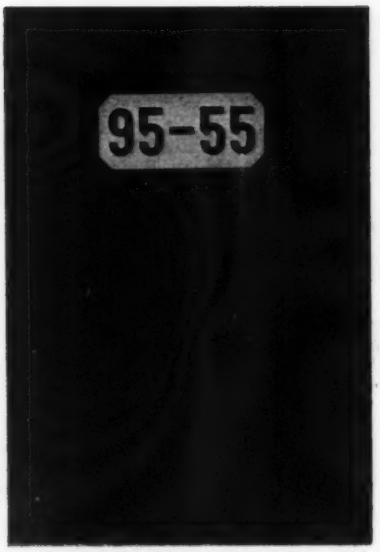
Currently in progress or planned is the reflectorizing of 46 out of 54 varieties of wayside signs, including speed, bridge, mile-board, whistle posts and yard limit signs. The new signs, many of them somewhat larger than before for still greater legibility, are made of aluminum in gauges from .064 to .081, mounted on one or two channel sections (heavy sections, 2.6 lb per lin ft, for maximum service in the field). They range in size up to 16 in by 42 in.

Have Reflective Backgrounds

Almost all signs use black lettering on a white background—black "Scotchcal" plastic letters on silver "Scotchlite" brand reflective sheeting. Color is used on the reflectorized restricting sign which is composed of alternating stripes of reflective yellow on black; and on three unlettered portable train-control signs, 16 in by 24 in in size, which consist of reflective yellow for "slow," reflective red for "stop,"

Other roads do it too . . .

SANTA FE, in a system-wide program, has reflectorized approximately 30,000 roadway signs. Speed-control signs like this have yellow reflective backgrounds which . . .



. . . AT NIGHT are brightly visible when seen in beam of locomotive headlights.

and reflective green for "resume speed."

In addition to its wayside signs, the Great Northern, which was one of the first to test reflectorized signs and crossbucks, is gradually replacing all of its crossbucks (as they wear out) with steel posts and aluminum cross-blades covered with silver reflective sheeting, which tests have shown to be more than 200 times brighter than white paint when seen in auto headlights at night.

The cross-blades are presently being made of .15-gauge 61S-T6 aluminum alloy, 6 ft long and 9 in wide, with 6-in black letters, but will probably eventually be made of extruded aluminum sections for greater rigidity.

The reflectorized crossbuck program—thousands of pairs of Great Northern crossbucks have been reflectorized so far—is an indication of the road's consciousness that motorists do run into trains—48 per cent of all fatal night-time grade-crossing accidents, for the nation as a whole, are the result of motorists running into the sides of trains that are already within the intersection.

How the Signs Are Made

The railroad's new sign shop, which turns out both reflective emblems and signs, occupies approximately 5,000 sq ft—being roughly 65 ft by 80 ft—in a reconditioned building in the Great Northern's Dale Street shops in St. Paul.

The ceiling and walls are painted white to get the maximum daylight effect out of the overhead fluorescent fixtures. The floor is a smooth, natural-colored concrete that facilitates the wheeling of table-loads of partially-made signs.

At one side of the room—partitioned off from the rest of the shop by a full floor-to-ceiling wall and equipped with its own air-exhaust fans—is the "bath" room. Here, the aluminum sign blanks, already trimmed and punched to specifications by the tin shop, get their cleaning, the first operation in the sign shop.

The cleaning operation starts with vapor degreasing, then soaping to remove printed matter, then rinsing, then a phosphoric acid bath to etch the surface and give it a "tooth" for maximum adhesion of the reflective sheeting, then a water rinse, and finally drying in a forced air bath. The entire process, accommodating 60 sign blanks at a time, takes about 12 min so that the cleaning time per sign blank is only about 12 sec.

On the other side of the sign shop is the vacuum applicator in which the reflective sheeting is bonded to the aluminum sign blanks.

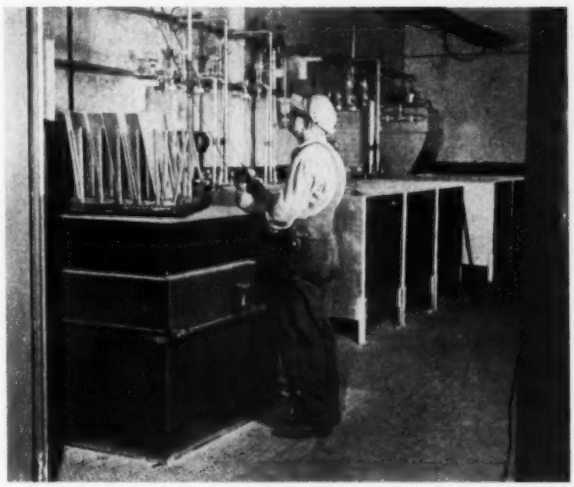
In the center of the sign shop, between the vacuum applicator and the "bath" room, are wheel-mounted tables on which are assembled sign blanks, reflective sheeting, letters and numerals, preparatory to being bonded together in the applicator. On top of each table is a ¾-in plywood "loading board."

The first step after the sign blanks have been cleaned is to lay them on the cloth-covered "loading board" on one of the wheeled tables, and to lay the reflective sheeting in place on top of the blank. Wide-angle silver reflective sheeting is used for almost all signs. A paper backing is peeled off the sheeting, exposing the adhesive-coated underside. This is laid adhesive side down on the sign blank, but does not "stick" since this type of adhesive must be activated. The table is then wheeled over to the vacuum applicator, and the "loading board" and its load of partially made signs is simply pushed on to the bed of the vacuum applicator. The cover of the applicator is pulled down, and after 6 min at 180 deg F the aluminum and the reflective sheeting are permanently bonded together.

How Applicator Works

The Great Northern uses a 5-ft by 12-ft vacuum applicator. When the cover is closed, it creates a vacuum pressure which holds the aluminum sheet and the reflective sheet firmly together while low-pressure steam heat activates the adhesive to effect the bond. The machine is designed so that the aluminum, the sheeting, and the lettering (if made of the same material or of "Scotchcal" brand film) can be bonded together all at once if desired.

Operations in the sign shop . . .

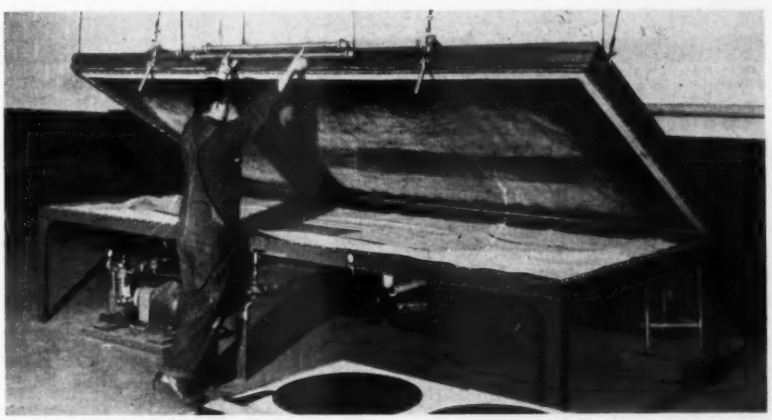


SIGN BLANKS are dipped in degreasing tank. In other tanks they will be soaped, rinsed, bathed in acid, rinsed again, and dried.

REFLECTIVE sheeting is bonded to sign blanks after which non-reflective letters are applied and covered with paper.

In the Great Northern shop, the sign blanks and sheeting are bonded together during one day, and the lettering is added during another day. A two-man crew in the shop can turn out crossbuck blades—completely reflectorized, lettered and ready for field installation—at the rate of 110 to 120 a day.

Letters and numerals are cut out by the shop on a band saw in a corner. In this operation 50 to 60 sheets of the reflective sheeting or the non-reflective film are stacked together between two pieces of plywood, and the "sandwich" is then brought to the band saw to be cut.



FOR BONDING letters to reflectorized blanks they are placed in vacuum applicator for second time, covered with muslin and the lid lowered.

Silk-Screen Work Too

Silk-screen jobs are also handled in the shop, which makes its own screens and does its own screening. Currently in progress is the silk screening of Great Northern Goat emblems on reflective backgrounds, for use on new cabooses and on small equipment such as automobiles, cranes, trucks, and tractors. Eventually the Goat is also expected to be used on selected railroad bridges across highways where it will be vividly visible to motorists approaching the bridge at night.

Four men in the shop handle all of the sign work for the entire system, while the remaining two use a spray booth at one end of shop to provide the inshop painting services required in the Twin Cities area.

AFTER BONDING, protective paper liner is removed. Sign is now complete.

BAND SAW is used to cut out letters and numerals for the reflective signs.

Gigantic Freight Terminal...

- Has two miles of enclosed tracks
- Introduces airplane-hanger doors
- Incorporates rigid-frame construction
- Has other interesting features

• Nearly half a million square feet under roof, including two miles of tracks, and completely enclosed—that's the Burlington's new $4-million rail-truck lcl freighthouse at Cicero, Ill., in the outskirts of the Greater Chicago area. In the new freight terminal the Burlington has consolidated the handling of all lcl shipments in the Chicago area, including those of its truck-line affiliate, the Burlington Truck Lines.

Incorporating some of the latest innovations in building design, materials and equipment, the giant freighthouse (see layout drawing) is approximately 275 ft by 1400 ft in plan with a 322-ft by 70-ft house used by the Burlington Truck Lines adjoining it at an approximate right angle at the west end. The building comprises six separate structural units placed adjacent to one another and sharing common column supports. Each of the units opens into the adjoining unit in such a manner as to give, in effect, a single building under a common roof.

The facility is laid out approximately in an east-west direction, with the road's three-track main line and train yards on the south and Twenty-sixth street on the north. The six building units from trackside (south) to street side (north) are: A single-story outbound house, a four-track car shed, a center platform shed, a second four-track car shed, an inbound house and general office and a house for the use of Burlington Truck Lines.

Auxiliary structures attached to the main freighthouse building include an outbound office, an inbound office, a garage for warehouse equipment, and a cooper shop, a hot-room and a cold-room. Other facilities include a heavy machinery platform served by a gantry crane, a team track also served by a gantry crane, and two "piggyback" platforms, both for the end-loading of trailers.

The entire freighthouse has a structural steel frame. Five of the six main building components (all except the BTL house) are placed side-by-side with columns supporting the various units at 22-ft centers along the entire 1400-ft length of the house. The BTL house also has a structural steel frame with column spacings at 20-ft centers. Each of the load-bearing columns throughout the freighthouse is supported on a concrete foundation bearing on clusters of treated wood piling driven to an average depth of 16 ft.

The inbound house-office section of the freighthouse is a two-story structure with brick walls and a roof of precast concrete sections covered with 1 in of cork insulation and tar and gravel roofing. The first level serves as the inbound house and comprises an unobstructed platform area 60 ft by 1400 ft, consisting of a 6-in reinforced concrete slab with a ¾-in hardened finish 4 ft above ground level.

FREIGHTHOUSE is of steel, brick and concrete construction and is completely enclosed. Upper portion of end walls is covered with aluminum panels, and track openings at each end are enclosed by special airplane-hangar-type doors.

Burlington's new $4-million freighthouse and auxiliary facilities near Chicago offer one of the latest examples of current design and construction practice for buildings of this type. Not only is the new structure about the biggest, but it is also one of the best-equipped freight-handling installations yet built.

Along the north side of the inbound house is a continuous row of wood overhead doors opening onto the track tailboard space. Lighting on the inbound platform, as well as on all other platforms which are unheated, is provided by quick-start, low-temperature fluorescent fixtures of the type originally developed for airport lighting where illumination in unheated areas is required.

Large Office Space Provided

The offices, located on the second floor above the inbound house, cover the entire 60-ft by 1400-ft area. This area is divided into nine principal sections, including the BTL offices, a multigraph room, tariff department offices, a lunchroom, a locker-room and washroom area for dock workers, a record room, local freight department offices, a medical section with offices, examining rooms and wards, and division offices.

The offices have concrete subfloors over 2 in of cork insulation. The finished floors are of asphalt tile except in the medical section where Marblette has been employed. Walls are plastered, with the exception of the washrooms where glazed tile is used, and ceilings are of the suspended type, finished with acoustical tile in most sections. Fenestration consists of continuous aluminum projected sash along all outside walls. Ordinary window glass has been used on the north, and heat-reducing tinted glass has been installed on the south, east and west sides.

Heating in the larger spaces is provided by a forced-circulation hot-water system with fin-tube radiators in metal enclosures running continuously along the outside walls. Individual offices and toilets have convector-type radiators. The heating system is controlled by individual automatic-positioning-type mechanisms which are activated by changes in the outside temperature. Lighting in all portions where drop ceilings are employed is furnished by flush-mounted fluorescent fixtures; elsewhere, suspended-type fixtures are used. Under-floor ducts carry electrical and communications cables to outlets at strategic points around the various offices.

Stairwells Attached to Building

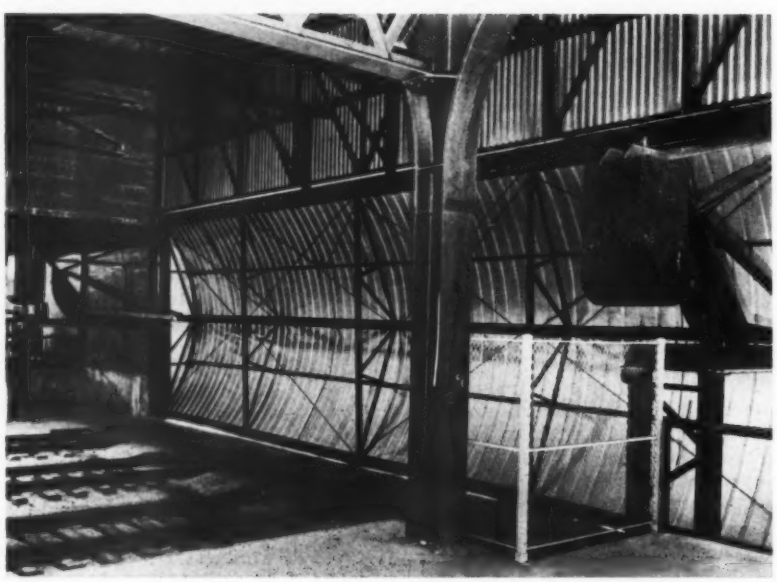
Attached at intervals to the north side of the inbound house are five stairwell towers providing access between the ground level and the platform and office levels. These towers are also of steel-frame and brick construction, with glass-block sections to provide light. The towers, which extend above the roof line of the house, also give access to the roof and provide the additional advantage of enhancing the appearance of the structure.

The single-story inbound foreman's office also projects from the north side of the inbound house about mid-way between the ends. This structure is of identical construction to that of the offices above the inbound house.

The 60-ft by 1400-ft outbound house is of practically the same construction as the inbound house except that it is a single-story structure with a poured-in-place 6-in concrete slab roof designed for a uniform live loading of 300 psf. This design loading will permit a

Interesting construction details . . .

RIGID-FRAME structure, consisting of three longitudinal bays, houses center platform area and the through-track sections on either side.



AIRPLANE-hangar doors consist of lightweight trusses covered with an aluminum skin. When opening, door pivots on semi-circular rocker arms at each end, while top is supported by horizontal tracks. Sensitive balancing permits door to be opened or closed by fractional-horsepower motor in 30 sec.

STRUCTURAL components of building share common column supports and open into one another to give, in effect, a single structure under one roof. Components are: (1) Outbound house; (2) through-track bay; (3) center platform bay; (4) through-track bay; (5) inbound house with general office above. BTL house (not shown) is attached to inbound house.

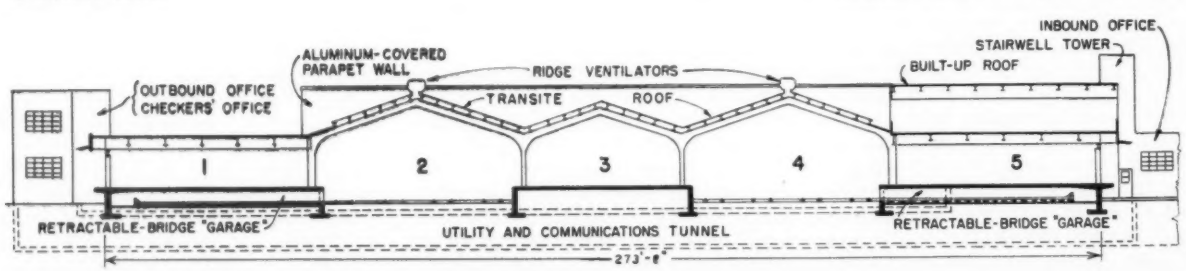
ROOF over rigid-frame portion is of corrugated Transite with interspersed sections of corrugated translucent plastic material.

second story to be added to the structure, should it ever be desired. The outbound house, too, has a continuous system of wood overhead doors serving a truck tailboard space along the entire south side.

Attached to the outbound house at the center is the two-story outbound foreman's office and centralized-checking-system office. The former occupies the first level, while the latter takes up the second-floor area. This building is of the same construction as the inbound office and general office sections.

Tracks Enclosed by Rigid Frames

Between the outbound house and the inbound house are eight through tracks divided into two, four-track portions by a 50-ft by 1400-ft concrete center platform similar to those in the inbound and outbound houses. The structure housing this entire track and center-platform area is of rigid-frame design, and the roof consists of corrugated J-M Transite, with Corrulux translucent-plastic panels



installed at intervals to transmit daylight to the tracks and platform area below. This rigid-frame section has three longitudinal bays, each sharing column supports with the adjoining one. One of the bays encloses each of the four-track sections and one houses the center platform.

Over the track areas the roofs are crowned by a series of ridge ventilators. At each end of the track-shed area the ventilators are 24-in wide and run continuously for approximately 167 ft. Between these 24-in units are a series of 12-in ventilators 44-ft long and spaced 88-ft apart. The extra long and larger ventilators were placed at the ends of the track sheds to carry off fumes from switch engines working the house.

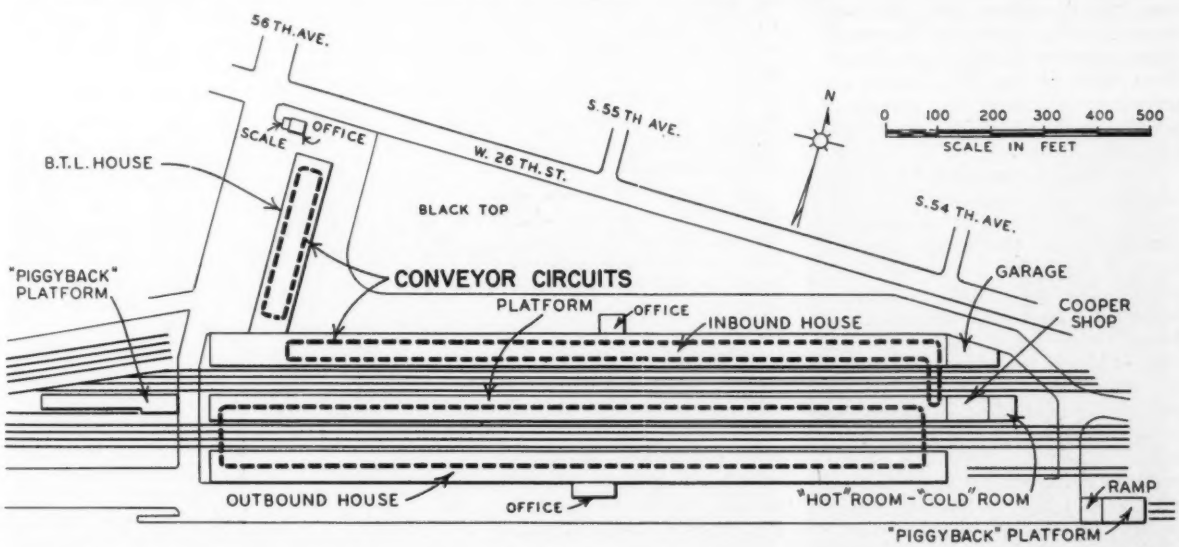
Special Doors for Track Areas

The ends of the rigid-frame portions of the structure are enclosed by brick walls in the lower sections with aluminum wall panels above. There are two 54-ft by 17-ft openings in the walls at each end for the tracks. These openings are each provided with a special airplane-hangar-type door, originally developed for use in hangars for jet-interceptor fighters. These doors, convex from top to bottom as viewed from the outside, consist of a series of light trusses covered with an aluminum skin. When opening, the entire door pivots on a semi-circular rocker attached to the door by a rigid frame. The top of the door is supported by two tracks similar to those used on

Extensive conveyor systems . . .

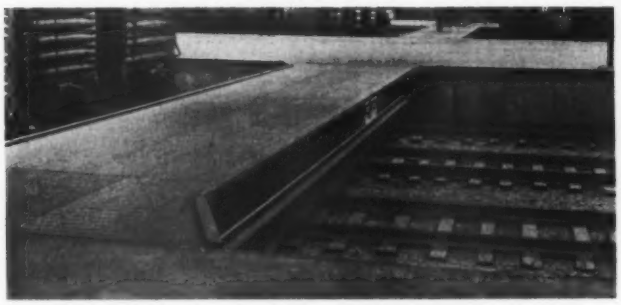
ENDLESS chain conveyor systems move warehouse trucks along platforms between various truck and car spots, which are each designated by number.

CROSSINGS of conveyor chains and railroad tracks at grade are provided by special heat-treated castings. There are 32 castings of this type in the freighthouse.



LAYOUT of freighthouse is designed to coordinate functions in the various sections. Three separate conveyor systems serve house, and trucks can be transferred from one system to another at points where they come close together.

Cross-over bridges "roll-away" . . .



ACCESS between inbound and outbound houses and center platform is provided by cross-over bridges which can be . . .

. . . RETRACTED into "garages" under platforms. Bridges are self-propelled. Jacks raise them to platform level.

other types of overhead doors. The door is balanced and counterweighted so that it can be opened and closed in less than 30 sec by a fractional-horsepower motor with a chain drive. Manual operation is also possible in case of an emergency. Rubber gaskets along the perimeters of the doors provide a weather-tight seal against the jambs. These doors were chosen because of their high strength, wind resistance and light weight.

At about the quarter points along the length of the freighthouse, expansion joints have been provided which cut the house transversely into four individual sections from the roof down to the foundations. Dual structural framing has been constructed at each of these joints. On the roof, the expansion openings are covered by an overlapping weather-sealed joint.

Construction of the BTL house is also of rigid-frame design with an unobstructed concrete platform area like the others and the same type of roof as used over the rigid-frame portion of the main house. Both sides of the BTL house are served by a continuous system of wood overhead doors along the tailboard spaces.

The freight terminal has three separate under-floor endless-chain systems for towing warehouse trucks around the house. One of the systems makes a complete loop around the BTL house. Another makes a loop of the inbound house, with an extension of the loop at the east end, which crosses the tracks at grade to the end of the center platform. The chains cross the tracks in special heat-treated castings. The third of the endless-chain systems runs the full length of the outbound house, crosses the tracks to the center platform, extends the full length of the center platform, then re-crosses the tracks at the opposite end of the house to the outbound platform.

Retractable Crossover Bridges

Access for power-driven platform trucks and trailers between the three platforms and across the tracks is provided by three 10-ft by 52-ft crossover bridges of the roll-away type, which retract under the platforms. Two of these bridges span between the inbound and center platforms, while the third spans between the outbound and center platforms. The bridges are of steel-girder construction with steel-grid-decks. They operate on channeled tracks which cross the railroad tracks at right angles on specially designed crossings. The channeled track rails are spaced 6 ft 11 in apart. To prevent the power wheels of the bridges from dropping down into the flangeways when crossing the track rails, special auxiliary wheels are attached to the underframes with their treads $\frac{1}{16}$ in above the running wheels; thus the main wheels drop only the $\frac{1}{16}$ in when crossing. The bridges are powered by electric motors with gear drives and are fully automatic.

A "garage" is located under the inbound or outbound platform, as the case may be, for housing each bridge when it is retracted. In retracting, the bridge is first lowered 11 in by means of a power jacking mechanism, so that it rests on its power wheels, then the unit is rolled under the platform into its "garage." When emerging, the reverse takes place. The unit rolls into place on its wheels, after which the power jacking mechanism raises the bridge 11 in so that it is flush with the platforms.

As a safety precaution, the roll-away bridges, track doors and under-floor endless chains are interlocked electrically with derails on each of the eight tracks at each end of the house. Before the derails can be thrown, the roll-away bridges must be fully retracted, the doors open and chains stopped.

Below the track and platform levels at about the center of the inbound house is the boiler and pump room and a power substation. Between the boiler room and the outbound house is an 8-ft by 8-ft concrete tunnel which carries all of the utility and communications services across to the other sections of the house. In addition, the tunnnel provides access for personnel between the houses.

In addition to a centralized checking system employing portable talk-back speakers for use in relaying information on shipments to checkers, the house is equipped with a complete intercommunication system with permanent talk-backs located at intervals along the platforms. These are connected to the consoles in the respective foremen's offices according to location. A paging system incorporating 360-deg speakers is also provided.

Fire protection is furnished by a 1000-gpm pump installed in the boiler room. The fire system is a dry-pipe installation with automatic motor-operated valves supplying water to hose racks at 150-ft intervals along the inbound and outbound platforms. Remote-control switches for the system are located at each hose rack. While the building is of fireproof construction and does not require protection, the nature of the contents handled in the house makes fire-protection equipment necessary.

Design and construction of the freight terminal were carried out under the direction of A. H. Simon, engineer buildings and C. J. Bonnevier, assistant engineer buildings.

The Art of Track Raising . . .

Part III — Tamping Techniques

Some of the tricks used by "old timers" to get over the track rapidly are described first in this, the last, installment of the series. The article then takes up the more conventional methods of hand tamping, and follows with a discussion of tamping with hand-held power tampers.

By Leo C. Blanchard
Roadmaster
Chicago, Milwaukee, St. Paul & Pacific
Minneapolis, Minn.

● There are so many ways of tamping track that it is hard to know where to start in discussing them. In explaining track raising we started out with an explanation on how to spot low joints, then we discussed spotting, cross leveling, surfacing and ballasting. Perhaps you would like to know some of the tricks used by the "old timers" to get over the track rapidly. Let me warn you, however, not to use these without first discussing them with your roadmaster. Some of these methods can be used to advantage under certain conditions, but good judgment is always required.

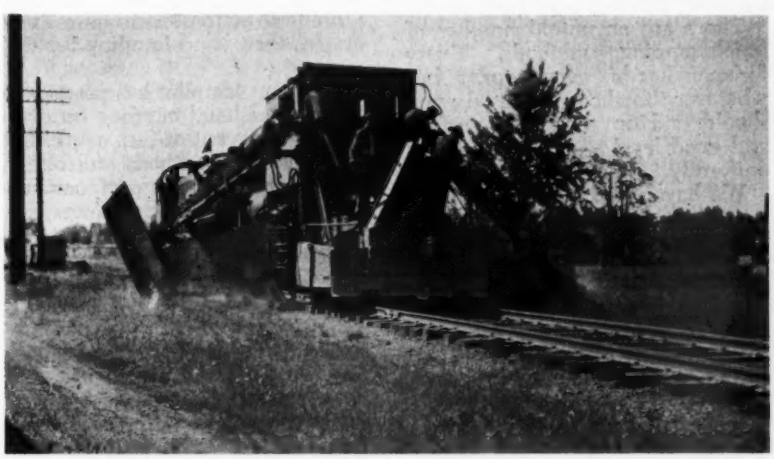
How to Raise Dirt Track

Let us begin with dirt track on a slow branch line. For this class of track many railroads show, under "Standard Roadbed Sections," the cribs filled to the top of the ties between the rails and in some cases to the top of the rail and sloped sharply downward to the bottom end of the ties to form a quick water-shed. A good axiom might be: "The worse the ballast, the better the drainage must be." I can think of nothing worse than a piece of dirt track lying in a trough, so that the water accumulates under the ties instead of draining quickly away. As each wheel load passes over the track the water suction causes the ties to be quickly undermined. As a result it is impossible to keep such track in level or in line.

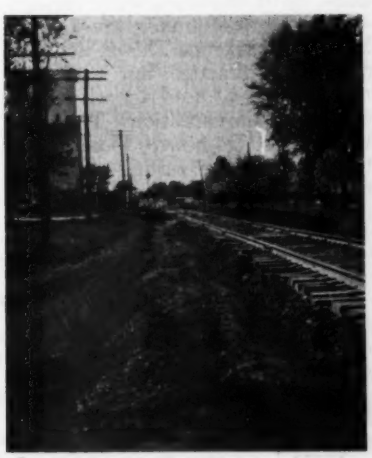
Tamping such track usually creates a worse soft spot than existed in the first place. Some foremen place boards under the ties, lengthwise with the rail. Quite often you end up by "wing tieing or duck footing." What are wing ties? Wing ties are new or secondhand crossties pulled in between the regular track ties so that they catch both rails, but extend out more on one side than on the other to give added support to the weak side of the track. They may be alternated to protect both sides. In addition to extending out and obtaining more bearing on the shoulder of the track, they create a more or less solid floor of ties under the track that will support greatly increased loads. This is something that can be done as a last resort.

Is there a better solution to the problem? The answer is "yes." For such a condition, I would strongly urge the use of a Jordan Spreader or similar machine to plow away the shoulder of the track to the bottom of the ties. Use a blade and give just a very slight slope so that the water will drain away from under the ties. It is extremely important that you plow deep enough so the water will drain from under the ties. To plow half way down on the tie is useless. Through cuts, the ditching blade should be used, but use care and get the ditch as far away from the track as the machine will reach and only as deep as necessary. After this blading work has been done, you will find that, when you spot up a low joint, you won't have to go back within a day or so and do it over again. With water no longer accumulating around the ties, your track will stand up to a three-day rain without going all to pieces. Best of all, your three-man gang can now accomplish more in a day, whether spotting track or renewing ties, than twice the number could previously.

How does this affect the tamping



SPOT TAMPING gives better results on certain types of track if material at ends of ties is first plowed away with Jordan spreader, says Mr. Blanchard.



PLOWING should be deep enough so that water will drain from under ties.

of the ties? Now that the tie ends are fully exposed, you must not disturb or break up the hard core of dirt that has formed under the tie bottom. For this reason, regular tamping with a No. 2 shovel is not recommended, although it may be done if care is used. Considerably faster, and in some respects a better way, is to raise the track to proper surface. Now observe the amount of space to be filled under the ties. Next, give the track some additional raise to make a good opening under the ties. With a No. 2 shovel, or perhaps a specially designed shovel, take enough dirt on the blade to handle easily and toss it under each tie in proportion to the amount of raise needed. With a little practice and study you will get the hang of it and find this is a fast economical way of spotting on this class of track.

Some foremen use a special refinement in this kind of tamping. From an old cross-cut saw, they fashion a long slender blade that will reach far under the tie. On this blade is placed a measured or estimated amount of dirt. This is shoved under the tie and then with a quick movement the blade is removed, leaving the dirt in place. This is more accurate than the method described above.

Please understand that I am not recommending this or any of the methods that are discussed here unless they are already accepted on your railroad. Some roadmasters are strongly opposed to any method with which they are not in agreement, and it would be wise to talk to your supervisor about any new ideas you might want to try out.

In ballast containing a high percentage of sand many foremen resort to raising and dropping the track with the idea that enough sand will drift under the ties to hold the track up. This is not recommended practice, but it can be, and has been, used to advantage under certain conditions. The trick to it is this: Do not try to complete the raise in one raising-and-dropping movement of the track jack. Instead, raise and drop two or three times at the same spot. This causes a blowing and sucking action that loosens the sand and pulls it under the tie. This method is used most successfully where the raises are very slight—¼ in or less.

Fast but Effective

I know a foreman who took over a section that was in a very bad shape for level due to water pockets and unstable fills. In places the track was three to four inches out of level and the track was under constant slow orders. With his crew of three to five men it seemed an insurmountable task ever to get the track in level. After some experimenting he evolved a system whereby the track on the low side was raised to 1 in higher than level. With some long-drawn-out, sharp picks the men then made three raking motions on each side of each tie, both inside and outside of the rail, just as in eight-point tamping. Enough material rolled under the ties so that when the jacks were dropped the track remained about ¼ in high.

The interesting thing about this experience is the fact that 1 in of over-raise on the level board seemed to be the ideal amount, regardless of whether the raise was ½ in or 3 in. Within a few weeks this foreman had the slow orders off his entire section and was able to keep them off until such time as stabilization was undertaken

A similar result can be obtained by using a long-bladed tiling spade. The tamper stands outside of the track and reaches as far under the rail as the blade will go and then chucks a little gravel under the tie on each side. The trick here is to learn just how much to allow on the level board for settlement.

There are an untold number of quick-tamping methods. Every foreman has his own favorite, but whatever method is used you should end up with good surface and good level with all ties being uniformly tamped.

We have been discussing quick-tamping methods, now let's talk about good tamping for a change. The most accurate track raising will avail nothing unless the track is properly tamped.

TECHNIQUE to use when tamping with a shovel is described by the author.

When spotting pit-run gravel ballast, regular tamping with shovels or tamping machines is best. Eight-point tamping is superior and this means tamping the tie on both sides, inside and outside of each rail. If the raise is more than 1 in and you are short-handed, you can compromise by four-point tamping. This means tamping one side of the tie on the outside of the rail and the other side of the tie on the inside of the rail, alternating across the tie. For best results it should be possible to push the ballast all the way under the tie from one side. Electric vibratory tampers are more successful than hand tamping for this purpose.

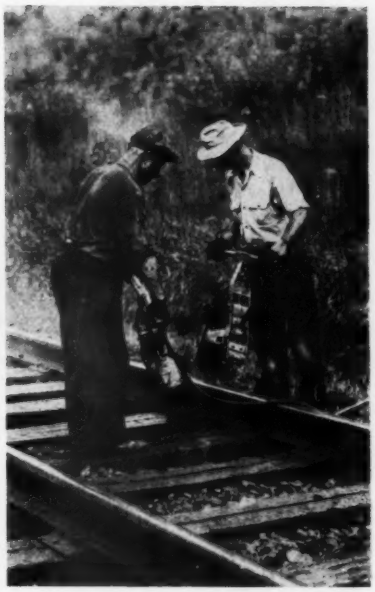
Machine tamping has practically superseded hand tamping on extra gangs doing out-of-face work, but hand-tamping methods still obtain on a large percentage of our section gangs and small maintenance crews. If a man knows how to do a first-rate job of hand tamping, he will recognize good tamping by any other means.

Since a large percentage of tamping is done in pit-run gravel with a No. 2 shovel let us consider that for a moment. So many raises made while spotting track involve openings under the tie ranging from ¼ to ¾ in. Tampers must be taught to dig down alongside the tie until

Signs of Inexperience

"You can spot a greenhorn instantly by his tamping method. First, he fails to dig down far enough to get to the opening under the tie. Next, he takes too much material on his shovel and starts stomping against the side of the tie, with only one hand on the shovel handle. All the while he is staring into space with a dreamy look in his eyes. The motion is strictly mechanical with no sense of pride or responsibility in the work. Good tamping is an art. Good tampers take pride in their work. Good raising foremen take pride in having good tampers."

WITH POWER TAMPERS it is just as important to get under the tie as when tamping by hand. Tampers should be taught to guide and hold the tools so that . . .



. . . TAMPING is done without undue physical strain for the workmen.

they can actually see the opening under the tie. For such small openings, the tie should be nipped and held firmly against the base of the rail.

The tamper should then take a small amount of dry, fine material —about two tea cups full on his shovel blade—and drop the blade quickly into the opening under the ties in such a way that the material remains on the blade. The secret of good tamping is then to keep the blade of the shovel under the tie.

You do this with a sideways sliding and tamping motion that never quite removes the edge of the shovel from under the ties. As the material on the blade of the shovel drifts into the opening it is forced farther and farther under the tie. As more material is needed on your shovel, select it carefully in small amounts so as not to plug up the opening under the tie. When you can no loger get any material under the tie, stop tamping.

Rock ballast is handled much the same way, except that a tamping pick is used to drive the material under the tie. It is just as necessary to find the opening under the tie and to avoid plugging prematurely.

When the opening under the tie increases to 1 in or more, good tampers can often dispense with the nipping bar. By tamping in unison and directly across from each other the material going under the tie will force the tie upward against the base of the rail.

There is quite a variety of tamping machines on the market of both the hand-held type and the on-track production type. Any of these are superior to hand tamping.

Must Get Under the Tie

With machine tamping it is just as important to get under the tie as with hand tamping. While the machine has a natural tendency to work its way downward to the bottom of the tie, if the raise is less than 1 in it may be necessary to remove some of the crib material ahead of the tampers. With higher raises it may be necessary to have shovel men throw material in to the tampers.

Inexperienced tampers often fight the tamping machines by gripping the handles too hard. This results in swollen hands and other physical discomfort. Teach your men how to guide and hold the machine so that it does the work without undue physical strain.

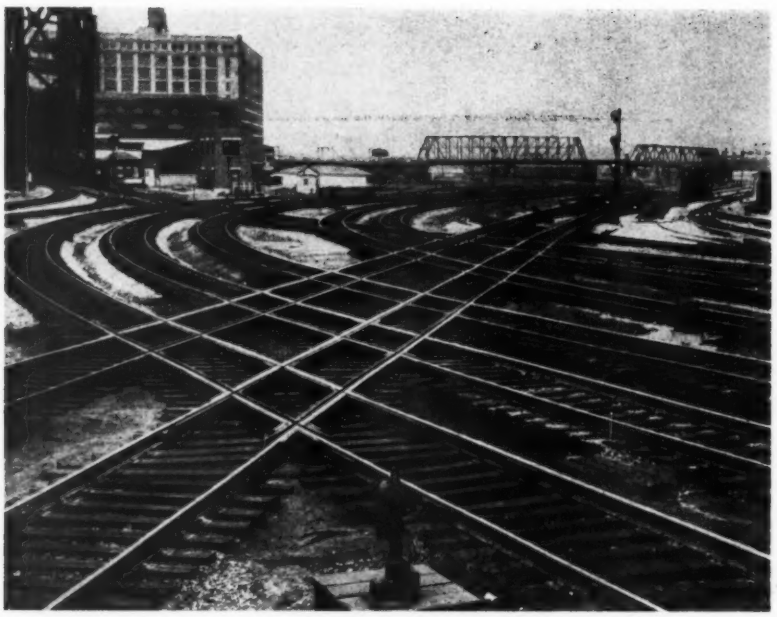
As a track raiser who is interested in good tamping, see that both ends of a tie are tamped at the same time. If one end of the tie is allowed to hang while the other is tamped, the tamping will not be uniform and it will show up later as bumpy track.

The power jack is one of the best power tools developed for use by the track department. Anyone who has lugged a 65-lb track jack all day will know what I am talking about. The power jack is now almost universal equipment on large extra gangs, but to my mind its potential is far from having been reached. In my opinion every roadmaster should have one or more of these machines for the use of section crews. Just think what a branch-line foreman could do with one of them during the spring rains when his track literally goes out of sight.

As an example of the capabilities of these power jacks, two years ago when high water threatened a quarter-mile stretch of track, we sent a power jack in to raise the track. The water continued to rise until it had risen 30 in above the original track bed. We had a work train stand by with gravel. We kept dumping and raising, dumping and raising on a 24-hr basis. Sometimes the water got ahead of us as much as 8 in but the power jack never faltered and we managed to keep the track in service throughout the ordeal. We tried to help out with ordinary track jacks, but the suction was so severe that they failed to do the job.

In this article we have frequently made comparisons between lining track and raising track. There is one great difference however: I have never known an extra gang foreman, a general foreman or a roadmaster who did not consider himself an expert track raiser. He has the utmost confidence in his own ability and in his ability to teach an assistant the art. I think this explains in part why track raisers are usually easier to come by than track liners.

By C. E. Weller
Division Engineer
Illinois Central, Chicago



MULTIPLE-TRACK crossing at Twenty-first street in Chicago helps to explain why "terminal maintenance is not something we can successfully define."

For Track Men in Yards . . .

Tips on Terminal Maintenance

The urgent need for maintenance economies is leading us "to a better way of railroading," says Mr. Weller in this article which is based on an address delivered before the Maintenance of Way Club of Chicago. He discusses methods of reducing tie costs, why excess ballast is costly, how to reduce snow-fighting expenses and the need for training young men as foremen.

● All of us are well aware of the squeeze on the maintenance dollar. The time is here when we must get more and more out of every dollar spent. This means we must look into every item of expense, no matter how small, and search for savings.

This rather somber picture is not without its sunny side. When we look on the brighter side we find that a premium has been placed on savings. There is a greater incentive to look for dollar economies in every operation. It is now imperative that we study every new product or machine and hope that it will help us. We are more receptive to methods and ideas that in better times we might have ignored. The result is that we are finding a better way of railroading.

Terminal maintenance is not something that one can successfully define. It is not something that we can completely cover with a set of rules. It is not something that can be taught from a book. It is a condition governed by many variables—more in fact than could be solved by equations. But there is a solution—good judgment. Good judgment, plus a driving incentive forced on us by lower budgets, gives us good maintenance which is the thing we are striving for. Dollar savings can be found in every item of maintenance—there are no exceptions, no unmentionables, no items too small. We must take the time and examine them all.

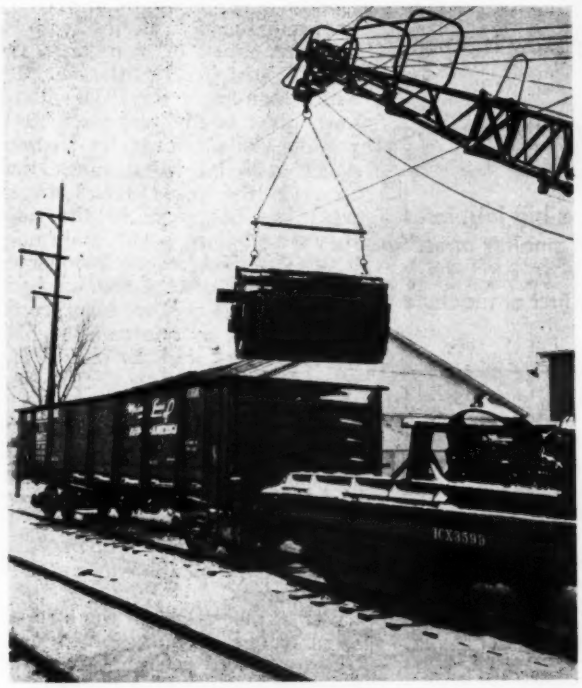
How Control Tie Costs?

Take ties as an example. The cost of installing ties on a terminal division is probably greater than on a line division, but much can be done to control this cost. Unloading and distributing ties involve a big expense. On line divisions ties are unloaded and distributed economically by work train. Due to multiple tracks and close clearances in a terminal, we find it impractical, and in many instances impossible, to have a work train to distribute ties. We have found it economical to have ties banded in lots of about 20 to 25 and unloaded with a Burro crane. Not only do we save man-hours in the unloading operation but we eliminate the expense of stacking ties and, very important to us, we eliminate a job that is always a source of personal injuries. In many instances we use a Burro crane or dragline to load the banded ties on push cars for distribution.

Studies we have made show that the bundling of ties costs us about 12 cents per tie for the additional handling and banding at the treating plant. We find that our labor savings in unloading and stacking ties by this method amount to about 22 cents per tie. This gives us an average saving of 10 cents per tie in handling cost.

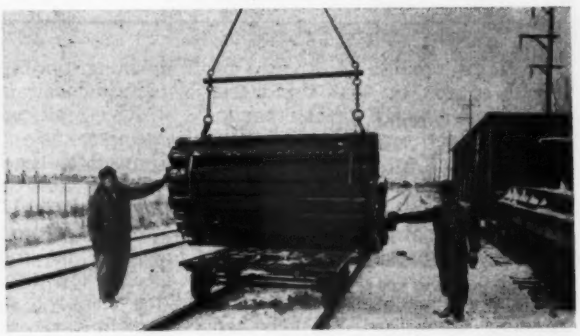
The problem of installing ties is a little different on terminal divisions. Because of restrictions and clearances, many ties must be dug in. Because of close track centers, certain types of tie equipment on the market today cannot be used. These restrictions make the installation of ties costly, so that there is a fertile field for improvement. The installation of switch ties is

"Take ties as an example . . ."



ECONOMIES in tie handling are realized by banding them in bundles of 20 to 25 and unloading them with a crane.

UNLOADING of ties in bundles saves man-hours, and does away with a job that's "always a source of personal injuries."



BUNDLED ties may be unloaded directly onto push cars for distribution. Banding is done at treating plant.

particularly expensive. Because we have many switches within a comparatively small area, it is easy for us to order switch ties individually rather than by sets. Only the bad ties are renewed and not the entire set.

The use of tie inspectors has been a big help on our railroad in increasing tie life. These men should be consulted and instructed before marking terminal ties. In locations where tracks cannot be raised, requiring that ties be dug in, we should try to get every year of tie life. Ties that appear to have 2 to 3 years life under ordinary circumstances may have 4 to 5 years life on tracks carrying light tonnage, such as passenger and suburban mains. The marking of ties by trained inspectors, along with the use of other measures for lengthening tie life, has produced some remarkable figures.

WEED BURNER melting snow at I.C.'s Central Station in Chicago. All of road's eight weed burners are used for such service in Chicago Terminal in winter.

Excess Ballast Is Expensive

Let us take a look at ballast for terminal use. We all realize the importance ballast plays in good maintenance. However, I wonder if we all realize the penalties we pay where excess ballast is used. In the first place it is a waste of maintenance dollars in ballast expense. In the second place the excess ballast increases our labor costs when doing such jobs as installing ties, and smoothing and lining track. In the third place, excess ballast leads to poor drainage conditions.

This brings us to the question: What is excess ballast? The answer is that every bit of ballast not essential for holding line and surface is in excess of what is actually required, and a source of maintenance expense. Terminal men must realize that the ballast necessary to hold line and surface varies with many factors. These include roadbed conditions, drainage, tonnage, and speed of trains. We find on many terminal tracks,

Quotable Quotes from Mr. Weller's address . . .

- "Every man-hour and every dollar spent fighting snow is a non-productive one."
- "We must take the time and the interest, and make the effort, to improve and educate this laborer."
- "It is easy to see the advantages of planning on a big job, but I wonder if we don't overlook these possibilities on smaller ones."
- "It is now imperative that we study every new product or machine and hope that it will help us."

that trains operate at greatly reduced speeds or that the tracks carry light tonnage, or at other locations there may be excellent drainage and roadbed conditions. In general, at such locations the tracks can be maintained with less than the normal ballast section.

While on the subject of ballast, I think it appropriate to mention the use of machines for ballast-dressing operations. On our terminal, in fact on our railroad as a whole, ballast dressing by hand has been eliminated. I can think of few pieces of equipment that have produced such large savings in labor as ballast-dressing machines. No one should overlook their possibilities.

Reducing Snow-Fighting Costs

We cannot talk about terminal maintenance in this part of the country without talking about snow protection. Here is an excellent opportunity for savings, because every man-hour and every dollar spent fighting snow is a non-productive one. On our terminal, we have two interlocking plants protected with electric switch heaters. We have several installations of propane gas heaters. Both of these services have the advantage of giving instant protection and can be handled by remote control. Both have the disadvantage of requiring labor to clean out the crib areas between the ties during and after storms.

We have one interlocking plant protected with steam coils. This installation has the disadvantage that about two hours are required to get steam through the entire plant. On the advantage side, it provides us with excellent protection, even in high winds, and leaves the crib areas completely clean after the storm. We also use oil-burning, pot-type switch heaters in certain locations.

Above all, we depend on weed burners. We have eight weed burners on the Illinois Central System, and all are sent to the Chicago Terminal for the winter. To prepare these units for snow-melting work the center burning heads, and the arm carrying them, are removed and the remaining four burners are fastened in a fixed position, two approximately over each rail.

Weed burners are the only protection we have on both of our humps at Markham yard, in our coach yard around Central Station and many of our busy yard leads. We are very happy with their service. Naturally we find there are some disadvantages; they do require track occupancy, so that the cooperation of the operating department is necessary. On our railroad, we have not found this to be a drawback. One of the big advantages of the weed burners in snow protection is that they clean up the entire switch area, melting and evaporating all snow and water.

It is largely because of our extensive use of snow-fighting devices and equipment that it is no longer necessary for us to hire extra labor to fight snow. Formerly, the number of additional men hired during heavy snow storms frequently ran well into the hundreds. The practice now, when trimming down the size of the section gangs for winter operations, is to leave them with sufficient men to handle practically any storm. However, because of the intensive mechanization of our snow-fighting activities, the regular winter force required is no larger than that needed to handle normal winter maintenance.

Let us now take a look at our labor problem. First of all, the use of many labor-saving machines has made it possible for us to perform our maintenance duties with a large reduction in man-hours. On the Illinois Central the maintenance man-hours for 1954 will be lower than in any year since 1941, yet the dollars spent for maintenance will be three times that spent in the year 1941. Look at what has happened to the ratio between dollars spent and man-hours. In 1933, for each dollar of maintenance cost (including both labor and material) we obtained 55 min of work by one man, in 1943 the amount of work for each dollar spent had dropped to 20 min, and in 1953 it was only 10 min.

This means we must get more work with fewer men. It means we must have better organization and better planning. It means we must have better supervision. It means we must have employees of a higher type all the way down to the laborers.

Let us take a look at the laborer. Here is one of our problems. In Chicago, there is competition for the available supply of labor; other industries are willing to pay more than we feel we can afford to offer. This limitation makes it almost impossible to hire better men. It leaves us with this alternative—we must do our best with what we have. Into the hands of this labor we are putting expensive machinery. The amount of capital invested in machinery per employee working is greater today than ever before. Good hard-driving supervision is essential, but not enough. We must take the time and the interest, and make the effort, to improve and educate this laborer.

From this group of section or B&B laborers, we also have the problem of picking and developing men for the position of foreman. Here we come face to face with our various labor agreements. Of course, they vary on the different railroads. On our railroad we are not able to pick men for the position of assistant foremen, but we are permitted to pick qualified men for machine operators. In this way, we are able to train young men for higher positions. It is important for us to have training positions that can be filled by appointment.

In conclusion, we must create among our supervision an attitude of receptivity to new ideas, while at the same time fostering the habit of being on the alert for new and better ways of doing things.

What is the one quality that seems to be possessed in common by track foremen with outstanding safety records? Read about it in this article* and decide for yourself if there is a relationship between . . .

. . . M/W Safety and the Golden Rule

By W. E. Cornell
Engineer of Track, Nickel Plate

● Five hundred years before the birth of Christ, Confucius was asked: "Is there one word which may serve as a rule of practice for all of one's life?" He replied: "Is not reciprocity such a word," adding, "what you do not want done to yourself, do not do to others." The principle expressed here is, of course, familiar to all of us; and it is the practical aspect of the application of this principle that I want to talk about.

A Study of Safety Performance

I recently conducted a survey among a group of our track foremen—a survey which, for sake of brevity, I shall call a safety performance survey. It was an attempt to find out why some foremen seemed to do things just a little better—a little more efficiently than others. In this survey I developed some facts which I believe will be interesting to all of you because they are pertinent to effective foreman performance. For purpose of comparison, it should be pointed out that work and responsibilities of the foremen in the group studied were for all practical purposes the same. But I found some very wide differences in performance. Five of the 45 foremen in the group had outstanding safety records—records covering periods from 25 to 48 years without a reportable injury. Not only did these foremen have outstanding safety records but each is rated as a very good foreman in the performance of all his duties.

I have known all these men personally for more than 15 years and they have as different personalities as you might expect to find in any average group of men. One is a very quiet-spoken man, almost diffident; another, a brother to this man, is big and husky—a sort of "come on boys, let's go!" type. Two others have a combination of many of the characteristics of the first two, and the fifth man, who has a record of 48 years without a reportable injury, carries an air of dignity about his work and directs his men with quiet and reassuring confidence.

Even though these five foremen differ widely in their personalities, they have one very important thing in common—a characteristic which unquestionably contributes largely to their success as foremen. They never use ridicule, sarcasm or any of the other methods of humiliation which cause men to lose interest in their work, respect for the boss and the feeling of loyalty to the company. In short, these foremen effectively practice good human relations. As further definition, good human relations to me is simply the everyday or working "clothes" of the Golden Rule.

Meetings With a Theme

Throughout our many years of organized safety we have held safety meetings of one sort or another. There are two things about the safety meetings which we have been holding during the past four years which are significant and which we feel make the meetings more interesting and hence more effective. First, they have a well defined theme. Second, they are of themselves a practical demonstration of employee participation in an effort to build better leadership and stimulate the cooperation necessary for successful safety and work performance. The theme of these meetings is this: "What is good leadership and what is the best way to achieve it."

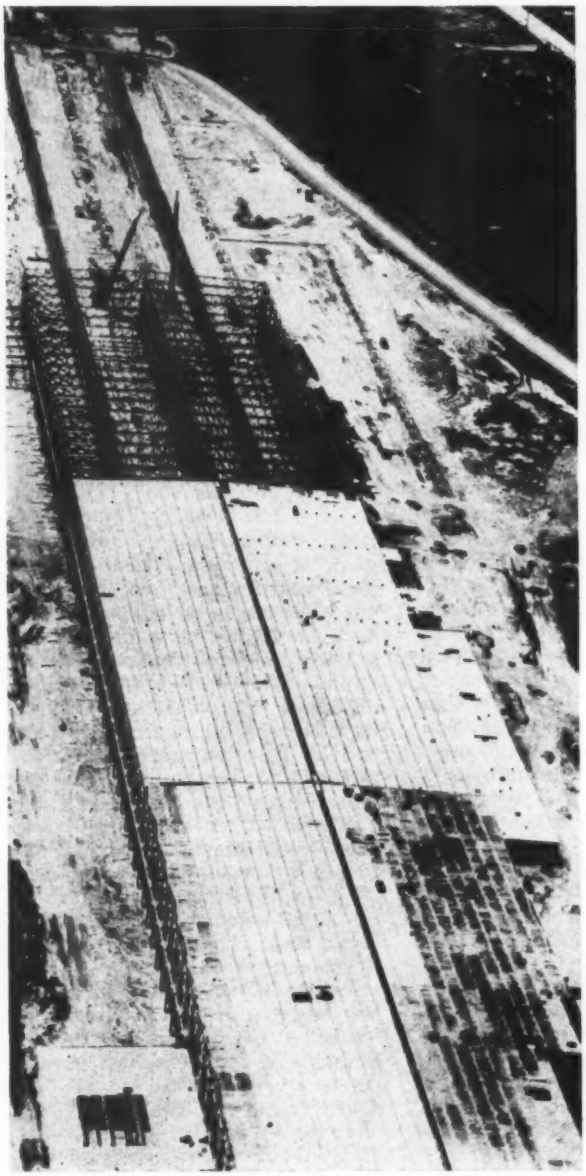
These meetings are attended by all maintenance-of-way field forces in groups of from 100 to 150 men, together with the division engineer and his supervisors, the safety director or his representative, and a representative from the chief engineer's office. A particular effort made to obtain employee participation in the meetings, is in the form of an open-forum discussion in which the foreman and other promoted men who attend this part of the meeting are encouraged—in fact urged—to express their ideas on how best to improve our safety performance. The response of the men in these discussions is very gratifying.

We frequently get some good ideas from these discussions, but of more importance, we believe, is the fact that the men who participate are thinking safety and feel that they are a part of the overall program.

Once they have expressed themselves I am sure they continue to be safety conscious for some time to come.

Briefly, you might summarize these meetings by saying they are an organized effort on our part to develop more democratic leadership, that is, the kind of leadership that respects the dignity of the individual and stimulates employee interest. This kind of leadership is being developed more and more today by many progressive industries. It is the kind of leadership which our experience has shown can successfully be applied to railroad maintenance-of-way work.

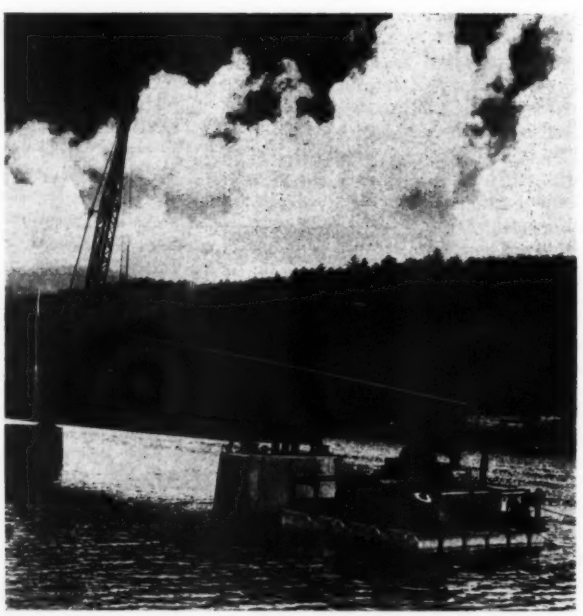
* From an address delivered before a recent meeting of the Railroad Section of the National Safety Congress at Chicago.



CAR REPAIR shops of the Pennsylvania at Hollidaysburg, Pa., (left), which were completed recently, have a continuous roof area of 700,000 sq ft, reportedly the largest roof constructed anywhere during 1954. Roof is of precast concrete slabs (above), each 2 ft wide and 7 ft 6 in long. Asphalt-asbestos mastic was used to seal the joints. Slabs were installed at the rate of 1200 (18,000 sq ft) per day.

News Briefs in Pictures . . .

EMBANKMENT along Burlington tracks at Kansas City is cleaned up and sloped with a Caterpillar HT4 Shovel.



GIRDERS for new Chesapeake & Ohio bridge at Snowden, Va., were erected in an unusual manner. Each girder was brought to rail head on dolly car, where dolly was used as a fulcrum while end of girder was lowered onto a barge. Barge then floated girder to other pier where it was "levered" into place by the crane, using the barge as a fulcrum. Barge was then removed and opposite end of span placed on its pier.

WHAT'S THE ANSWER?...

. . . a forum on track, bridge, building and water service problems

Testing Control-Cooled Rail

What policy should be followed in the testing of control-cooled rail with detector cars? Explain.

Tests All Rail Annually

By H. B. Orr

Assistant Engineer, Union Pacific, Omaha, Neb.

Before the advent of control-cooled rails detector-car findings consisted principally of transverse fissures originating from shatter crack nuclei. When control cooling came into use there was a widely held belief that, since transverse fissures had been eliminated, detector-car testing could be discontinued or at least substantially reduced.

However, it has been demonstrated by this time that control-cooled rails will eventually develop the same number of fissures as did the non-control-cooled rails although they occur at a substantially higher tonnage age. Control-cooling does not eliminate fissures, it only lengthens the life of the rail sufficiently to develop a different kind of fissure, namely detail fractures from shelling. While shelling had been known before control cooling it was not so prevalent and was of a somewhat different nature.

On this railroad we have no arbitrary time or tonnage age at which we start to test control-cooled rail. Once each year all main-track rail is tested regardless of age. If this test develops a substantial number of defects in any particular territory that territory is placed on the regular testing schedule. From then on it will be tested at intervals ranging from 60 to 180 days depending on the traffic carried and condition of the rail. The occurrence of a few service failures is also considered sufficient reason to place a territory on the regular testing schedule. Generally speaking, the tonnage age at which control-cooled rail is placed in the regular testing schedule will average about 120-million tons although there will be wide variation from this figure depending upon local conditions.

In addition to regular detector-car testing, our rail is tested with various ultrasonic devices such as Audigages and Sonirails to find web cracks in the joint-bar area. Bolt-hole and other web cracks seem to be somewhat more prevalent in the control-cooled rail. This is probably because of the greater age which it attains.

Better to Err Toward Frequency

By G. M. Magee

Director of Engineering Research, AAR, Chicago

While it is true that control-cooled rail has to all intents and purposes eliminated the development of transverse fissures, nevertheless, there are types of rail defects that develop in control-cooled rail which make it advisable to test this rail with detector cars. The most important types of defects in this category are detailed fractures from shelling and engine-burn fractures. In addition to these, vertical split heads should be included. These also offer a safety hazard.

Just how soon control-cooled rail should be tested with detector cars after it is laid new depends upon several factors. The three types of defects mentioned above are progressive fractures. These require a considerable number of passages of car wheels before a defect of serious consequence develops. It is obvious that the density of traffic will be one of the most important considerations in their development. Therefore, no specific period of time can be stated that will apply in general to all main-line track. In my opinion the only satisfactory procedure with which to gage the period at which testing of control-cooled rail should be started, and the subsequent frequency of

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, Railway Track and Structures, 79 W. Monroe St., Chicago 3, and reach him at least five (5) weeks in advance of the publication date (the first of the month) of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To be Answered In the May Issue

1. What factors should govern the degree or extent of re-use of the principle types of track fastenings in the various classes of service—main line, secondary line, branch line or yard? Explain.

2. When masonry buildings show signs of settling because of unstable foundation conditions, to what extent can grouting be used to stop such settling? How should the grout be applied? Explain.

3. To what extent is it advisable to use dating nails or other methods to mark the installation dates of crossties? Is there less need for keeping individual tie-life records in view of the almost universal use of treated ties? Why? Explain.

4. What is the most economical and effective method of reinforcing the upper flanges of floorbeams and girders that have been reduced in effective area by brine action? Explain.

5. How can one determine which side of the track should be designated as the line side? Does it make any difference whether the line is single or multiple track? Why? Explain.

6. When a pump is placed in service as a standby emergency unit, what steps should be taken to protect it against rust and corrosion? Explain.

testing, is the development of service failures.

In a given territory, if experience has shown that service failures are likely to start developing after three years, then three years should be selected as the age for testing new control-cooled rail in this territory. Similarly in the repeat testing, if experience has indicated that after a period of six months service failures are likely to start developing, then retesting should be conducted at least at six-month intervals.

One factor in detector-car testing is an economic balance between the cost of testing versus the cost of derailments that may occur as a result of service failures. Other factors include the humane consideration of avoiding the loss of life and the practical consideration of tying up the railroad with resultant delay and loss of traffic therefrom. The advantages of detector-car testing are so great from the standpoints of saving human life, damage to property and effect on public relations that in my opinion it is far better to err on the side of making the period before starting tests and the period between repeat testing of control-cooled rail too short rather than too long.

Adopt a Definite Policy

By J. E. Fanning

Assistant Chief Engineer, Illinois Central, Chicago

The policy to be followed in the testing of control-cooled rail with detector cars, particularly the frequency of such testing, should take into consideration a number of factors. These factors may vary widely on different railroads and even on districts or divisions of the same railroad.

It seems wise, however, that each railroad should consider its own situation and then adopt a definite policy for the guidance of its detector-car operators. After a study of conditions existing on our railroad as well as the progressive rate of failure of control-cooled rail from year to year from all causes, including detailed fractures from shelling, web failures, and failures within the limits of the joint bars, it was decided to follow a procedure such as that now in effect. Operators were instructed to test, on each trip in 1954, all rail rolled previous to and during the year 1946, also all rail rolled in 1947-48-49 and 50 was to be tested on the first trip after April 1, 1954. Rail rolled in 1951-52-53 and 54 was not to be tested that year. These instructions are revised annually.

The development of control-cooled rail has been of inestimable value in reducing failures due to transverse fissures but because of other types of failures, some of which were previously mentioned, it is felt that the continued operation of our two company-owned detector cars, equipped with modern carriages and additional magnets for reducing false indications, is fully justified.

Control Cooling Not Cure-All

By A. D. Kennedy

Assistant Engineer, Atchison, Topeka & Santa Fe, Chicago

It should be stated that the process of control cooling of rails prevents shatter, or internal thermal cracks which have been identified as the source of transverse fissures, but unfortunately control cooling is not a cure-all. There are many other transverse defects in rails, such as compound fissures and detail fractures, which give great concern and are not at all affected by the control-cooling process. Due to traffic density and high speeds, these latter types of rail failures are definitely on the increase.

It has been my observation that, in general, control-cooled rails are softer than non-control-cooled and are, therefore, more subject to flow. This is the forerunner of a shelly condition and detail fractures in the shelly spots.

Unlike transverse fissures which occur with equal frequency on tangents and curves on a mileage basis, compound and detail fractures predominate on curved track. The ratio, according to my experience, being four to one. Since these types of failures show up on curves first, it would seem that, with limited availability of detector car service, more attention should be given to the testing of curves.

In track, which normally carries 15 million gross tons annually, transverse fissures have been known to develop within one year after the rail is laid. (In fact, I have found a defect of this type in a rail that was never in track.) Under the same conditions, compound and detail fractures rarely develop until after seven or eight years of service although exceptions would occur in locations where severe conditions are encountered as to type of equipment, traffic and axle loads. With lighter or the heavier traffic mentioned above, the time element between tests should be adjusted accordingly.

Specifically, with operating conditions and traffic limitations as above, I do not think control-cooled rail need be tested with detector cars until after seven or eight years of service. At this time attention should be directed to the testing of curves—for instance when testing annually, alternate between out-of-face and curves only until such time as transverse defects begin to show up on the tangents. When this occurs testing should be done out-of-face at least once a year and oftener if possible.

It should be recognized, however, that earlier and more frequent testing is an added insurance against the occurrence of service failures.

Consider Two Basic Facts

By W. K. Hooper

Assistant General Manager, Sperry Rail Service, Danbury, Conn.

When we discuss testing policy with an individual railroad, we usually have at hand facts and statistics pertaining to that particular railroad's operaion. Our comments here are more of a synthesis of our experience with many railroads. We must, therefore, start with two basic facts:

(1) Any rail testing policy must be dynamic.—CC rail is relatively new when viewed in perspective with rail-failure experience and rail testing. To cite an example, defect development in CC rail has doubled since 1949. Differences between districts on a railroad must be evaluated; integrating the impact of many factors on rail-defect development.

(2) No single testing policy for CC rail provides adequate protection for all railroads.—Our consideration recognizes differences among railroads in operating speeds, tonnage, etc. However, all CC rail over 10 years old is tested by detector cars. The answer to the question can, therefore, be simplified into its two logical parts: When should CC rail be tested, and what testing frequency is adequate?

We asked a representative number of railroads to rank those factors which influenced their decision to test CC rail. Considered in the order of importance, the following factors are used for policy decision:

(1) Defects—CC rail over one year old

is "spot tested." Results from "spot testing" are studied to determine when out-of-face testing should be scheduled for the particular rail represented by the sample selected for spot testing. Spot testing involves scheduling a detector car to test a reasonable sample (10 per cent of the rail) to see if defects have started to develop in any stretch of new rail. The purpose is to prevent "derailment inspired" first test of the rail involved. Service failures, if they occur before spot testing or out-of-face testing is scheduled for the rail involved, also influence the decision to test.

(2) Operating factors—Tonnage, age of rail, location of the rail, class and speed of traffic—in their respective order—figure in the decision to test. It is apparent that their experience with testing programs and previous evaluations of CC rail show that operating factors influence considerably "when to start testing." Here again, known factors are evaluated and weighed in accordance with the individual railroad's experience, to predict when defects might be expected. Spot testing or out-of-face testing is scheduled in accordance with the particular railroad's exeprience prior to the expected onset of service failures in the new rail.

When a detector car is testing in the vicinity of new CC rail, it is inexpensive to test a representative sample of that rail—particularly when the car must move over the rail anyway. Spot testing wisely used gives the maximum protection yet recognized, budget limitations precluding out-of-face testing of all rail over one year old. According to our survey more than half of the CC rail laid in the last four years was out-of-face or spot tested.

By testing frequency I mean the average number of tests per year for CC rail once it is included in the testing schedule. Testing frequency is also used in a comparative way because there is often as much reason for differences in test frequency for different locations on one railroad as there is need for a different testing frequency for various railroads. The engineer interested in a planned testing program must begin by getting factual data for evaluation. He naturally finds an approach similar to statistical quality control in manufacturing a valuable tool. There is an optimum testing frequency for any large segment of track. The factual data is grouped for convenience in the following paragraphs, but in actual practice it is interrelated. An overall evaluation of all pertinent facts similar to operating research is required.

(1) Defect growth—An adequate testing frequency insures detection of defects while small enough to be removed from track prior to failure in service. Defect growth or the relative proportion of defects in the small, medium, and large categories must be examined. An abnormal number of defects growing beyond the small size between tests generally indicates less than adequate protection against derailment. A continuing high percentage of small defects reduces considerably the chance of derailment. Actually very little is known about defect growth except through an understanding of testing statistics because no research program which involves leaving defects in track to grow has been feasible in the last quarter of a century. The only available source of data in regard to growth, apart from theoretical laboratory data such as rolling load tests, are available through statistical and graphical presentation of testing results.

(2) Defect density—The number of defects occurring in any stretch of track must be examined for an indication of the trend. The age of the rail must be considered in evaluating the trend and in this evaluation occurrence of defects after the rail is five years old is often particularly significant. The most helpful way to examine or evaluate the trend in defect density is again in statistical or graphical presentation where, at a glance, any significant variance in defects can be spotted and appropriate action taken in planning subsequent tests. Such a method was described by W. C. Perkins, chief engineer, Union Pacific, in the December 1952 issue of the Sperry Review.

(3) Service failures—The appearance of service failures on detector-car charts gives immediate notice that testing schedules must be modified to keep pace with changing conditions. In any location, repeated occurrence of service failures due to growth of defects between tests, is a definite danger signal. Testing frequency is immediately considered. Again a systematic approach including an evaluation of the growth of defects to complete service failure between tests is necessary. It is known that detail fractures in CC rail fail at a smaller size than transverse fissures in non-CC rail and this further highlights the importance of scheduling adequate testing frequency to provide safe control-cooled rail.

(4) Other factors—In any consideration of CC rail the two major important types of defects, well documented in AREA statistics, are compound and detail fractures, and joint defects. These two in combination account for ¾ of all defects occurring in CC rail. Compound and detail fractures have increased steadily. The increase is most significant in evaluating defect occurrence in CC rail rolled since 1940. Defects per 100 track-miles in CC rail are approaching the rate of occurrence of transverse defects in non-CC rail.

Since 1949 the total number of defects occurring in CC rail excluding those in the joints is 30 per 100 track-miles. When defects in the joints are included, the total of all defects exceeds 45 per 100 track-miles. These two averages underscore the importance of a testing policy for CC rail.

Distributing Ballast from Hopper Cars

What are the most effective methods of getting the desired distribution of ballast when unloading it from commercial hopper-type cars? Explain.

Use Ballast Board

By W. E. Cornell

Engineer of Track, New York, Chicago & St. Louis, Cleveland, Ohio

For distribution while dumping from hopper cars we use a device which we call a ballast board. This board may be made up from either wood or ¼-in or ⅜-in boiler plate. We have found the boiler plate to be the more satisfactory. The board is about 5 ft 8 in long by about 3 ft 6 in wide with 8-in by 8-in openings located along the longitudinal centerline of the board about 2 in inside of each rail. The trailing edge of the plate is turned up about 1½ in to 2 in to provide for bearing against crossties which are placed in front of the wheels. The front edge of the board is bevelled or turned up slightly to prevent catching on rail ends at the joints.

Two boards are used for unloading ballast. They are connected together but are spaced at proper distances apart under the car to protect the dumping from each pocket. Crossties are placed back of and in front of the boards. The tie in front protects the board against backup movement of the train. The boards are pulled forward by chains attached to the sides of the car. These chains also serve to position the boards with relation to the rails. If ballast is not required between the rails the two 8-in by 8-in holes are covered by suitable 1-in boards. The use of these ballast boards enables us to deposit the ballast on the ends of the ties just outside the rails and also near the rails on the inside. The amount of ballast dumped is governed by the amount the pocket doors are opened and the speed of the train. The pocket doors are chained at a predetermined width of opening.

When ballast is dumped without the use of boards, we sometimes use a hoist attached between the pocket door and the side of the car. This enables us to adjust the size of pocket opening as the car is moved along the track. This arrangement has proved satisfactory in many instances.

Proper Control Essential

By R. V. Dangremond

Roadmaster, Elgin, Joliet & Eastern, Gary, Ind.

The most effective method developed on our railroad for getting the desired distribution of ballast when unloading it from commercial hopper-type cars has been by proper control of the car while being unloaded. This control is obtained by the combination of several means, but the judgment of the track foreman in charge of the unloading operation is of first importance. No mechanical means have been devised to replace good judgment as a necesssary means of securing the desired distribution of ballast over track which has been or is to be raised in varying amounts from ½ in to 6 in or more. Therefore, a foreman should be assigned who has this necessary judgment qualification.

The track foreman in charge of unloading is guided in his distribution by the amount of ballast required to fill out track that has been surfaced or by grade stakes set for surfacing in the case where ballast is unloaded prior to raising the track.

When unloading ballast from center-dump commercial cars a creosoted crosstie should be placed across the rail in front of the trailing truck of the car being unloaded to clear the rail as unloading progresses or to plow down excessive ballast. An adjustable pipe jack placed between the front and rear doors of the hopper provides a minimum opening as unloading starts. This jack is placed about a third of the way in on the door and is lengthened or shortened by means of a 14-in diameter wheel on the jack to allow more or less ballast to flow.

Normally the cars are shoved by the work-train engine and unloading starts with the first car of the work train relative to the direction of travel. This eliminates the necessity of stopping and pulling back after each car is unloaded and enables us to use two sets of ties and jacks on adjacent cars. With this arrangement the unloading can be done continuously by opening a full car when the one ahead is almost empty. As the unloading progresses the jack and tie are moved from the empty car back to the car immediately behind the one being unloaded.

When unloading ballast for dressing purposes or for a light track lift, homemade ballast pans are hung by chains under the door opening and over the rail. These give a fairly even light spread of ballast.

We have found that ballast unloading if properly handled with commercial-type center-dump hoppers gives an even distribution and requires very little rehandling for dressing final work.

When it is necessary to build up the ballast shoulder or raise the subgrade shoulder we have unloaded ballast from side-dump commercial hoppers. In these cases the flow of ballast is controlled very effectively by the use of chains which allow only that amount of door openng necessary to supply the required ballast.

Uses Chain Clamps on Car Doors

By Ira W. Toy

Roadmaster, Soo Line, Drake, N. D.

There are several items that must be considered before starting to unload gravel from commercial hopper-type cars to insure the desired distribution of the ballast. First, the condition of the old ballast. Will it require more shoulder than the average? Second, the weight of rail being worked. The smaller the rail section the greater the ridge of gravel that must be unloaded on the outside to make the lift. Third, the condition of the gravel being used. Is it free running, and if it is pit-run gravel, how big are the cobblestones that may be found in it? With this information, and a little ingenuity, a fair job can be done.

On ore "jims" I use chain clamps on the car doors so that they can be opened only so far. This prevents the gravel from flooding the rail, which might under those conditions cause the car to derail or the train to become stuck.

On drop-door commercial hopper-type cars I use a chain with a grab hook and put it around the angle irons between the doors of the car. This lets the doors open just far enough to let the amount of gravel that I want come out. There is always some gravel deposited on the top of rail during movement of the train when unloading this type of car. Flow must be controlled so that only as much gravel as is required to fill the center up to the top of the rail is unloaded during the "first dump." Then on the "second dump" only as much gravel should be unloaded as the cars can be pulled through without getting stuck or derailing.

Six to eight cars can be handled very easily ahead of the spreader. If two or more spreaders are available it is nice to have them come in behind such a cut of cars. With that arrangement, unloading can continue right along without switching. It is always nice to have treated ties on the spreader in case of trouble. One can then plow the excess ballast unloaded from any car off the track with the ties placed ahead of the wheels on the following car. I figure that 40 cars will give a mile of track a good 6-in lift if the old shoulder is anywhere near up to standard. Experience is a great help when using cars of this type. It takes a little longer and requires good supervision.

Get Cooperation of Train Crew

By T. J. Barcio

Roadmaster, Chicago & North Western, Norfolk, Nebr.

From my experience in handling ballast from hopper-type cars I find that talking over or discussing my work plans for unloading ballast with the work-train crew familiarizes them with my ideas, and thus having gained their alert cooperation, the desired results in the distribution of ballast are readily obtained.

Here is the way I handle it. The work train picks up 10 or 12 cars of gravel in hopper cars—more than this amount is difficult to handle satisfactorily at one time—and shoves these cars ahead of the engine so that the engineer is always looking ahead to see every move made. Start with the head car. Place a 14-in by 14-in by 9-ft timber across the rails ahead of the rear truck of the car being unloaded and chain it to the wheel hub on both sides of the car. Then open the bottom of the hopper, one or two doors at a time depending on

how the gravel unloads. There are generally three openings in a car. A door should be ready to open, while the train is moving slowly, as soon as the flow from the first door opened indicates that flow of gravel is getting low.

When the first car is empty the timber apparatus or equipment is moved to the next car. About two or three miles per hour is the right speed for the train when unloading gravel for a 5-in to 6-in raise. This will allow enough gravel for a 6-in raise and standard shoulder.

When a lighter spread is wanted the train is moved a little faster, especially if you want the spread for shoulder only. In this case two pairs of usable angle bars are spiked on the bottom of the timber at an angle to serve as a plow. This will clear most of the ballast from the center of the track and place it on the outside. Use "skirted" angle bars of the same weight as the rail; not the sheared or toeless bars.

I find this method or procedure very satisfactory when unloading ballast from hoppers for both surfacing track and shouldering. We make very good progress unloading anywhere from 20 to 26 cars per day where traffic is light, say two to three trains a day. This operation is, however, confined or limited to lines where there is no automatic train control.

Water Delivery to Diesels

What points in the water-delivery lines at a diesel service station provide the greatest friction losses? What may be done to eliminate or reduce these restrictions, thereby shortening the time required to service diesel locomotives? Explain.

Question of Relative Economics

By J. H. Upham

Assistant Engineer of Water Supply, Louisville & Nashville, Louisville, Ky.

The question is one of relative economics as it is theoretically possible to reduce friction losses to very nearly zero. This may be done simply by providing extremely large pipe and fittings with long-radius turns up to the point of delivery to the locomotive. It is at this point that the greatest friction losses are likely to occur for the locomotive manufacturers have limited the flow into the locomotive tanks to from 250 to 300 gpm by restricting the size of the inlet pipe and air vent. No matter how large the supply pipe, delivery hose and fittings may be, any effort to force more than the above amount of water into the tank of a diesel locomotive simply increases the back pressure at the point of entry. The question then is whether the maximum rate of flow of 300 gpm per unit is required, and, if so, what pressure and flow are available from the supply.

Facilities for watering diesel locomotives fall into two general types. At major terminals where locomotives are changed out at the end of their runs, it is quite likely that sufficient other work will be done to the locomotive at the same time to make the time of watering of no critical consequence. It is customary to fuel, water and inspect motive power at one time and in one spot, and enough laborers are usually on hand to tend the hoses so that the watering will ordinarily be completed before the other work. Under such circumstances, as the full 300 gpm is not required, ordinary municipal water pressures are usually high enough to provide adequate flow through supply pipes of not over 4 in diameter. Hydrants, delivery hoses and fittings can then be of a smaller size, and thus cheaper to install and maintain and easier to handle.

If it is necessary to condition the water with a wayside plant, it will probably be found cheaper to provide a storage tank for the conditioned water and deliver it by gravity or through a booster pump than to install a conditioning plant of sufficient size and capacity not to restrict the flow too much. If the diesel-servicing area is near the point where steam locomotives were formerly watered, and it often is at terminals, it is frequently possible to utilize the existing facilities at least insofar as the storage and dispensing of the conditioned water is concerned. The elevated tanks and large pipelines formerly leading to steam-locomotive water cranes will provide a great enough rate of flow at the diesel watering point if they are located reasonably close to the servicing area.

With the long terminal-to-terminal runs turned in by diesel locomotives it is impossible, of course, to carry enough steam generator water to last the full distance and it is necessary to have wayside watering points at scheduled stops spaced from 3 to 5 hr running time apart. This spacing is entirely dependent on the capacity of the locomotive water tanks which may vary from 1050 to 1950 gal, the length of the trains, the number of units required to handle them and the climate of the territory through which they operate. This must be worked out for each railroad individually.

It is quite likely that it will be found necessary to establish intermediate watering points at stations where no other servicing operations are performed, where the station-stop time is limited and where employees to handle the hoses are few. If we estimate that 1000 gal of water will be required for each unit and that of a possible 10-min station stop, 5-min will be consumed in connecting and disconnecting the hoses, it is seen that the water supply must deliver 250 gpm per unit. The total rate of flow required is, then, this figure multiplied by the maximum number of units to be watered at any one time.

Appropriate flow-control devices must also be provided to limit the flow when fewer units than the maximum are being watered. With the probable magnitude of the total rate of flow determined, the need for a booster pump will probably be indicated and a careful calculation of the theoretical frictions will give the most economical balance between the size of pump and larger pipe.

Another factor to be considered is that of making the delivery apparatus consisting of hydrant, hose and fitting as easy to handle as possible so that the available labor force can conveniently connect and disconnect them under the worst possible conditions to be encountered. This may mean keeping the size smaller than would be desirable from the standpoint of friction-loss control. Again, if wayside conditioning of the water is necessary, it will probably be more economical to store the conditioned water and pump to the locomotives with a booster pump so as to keep the capacity and cost of the conditioning plant to a minimum.

Design Station to Meet Demand

By J. E. Wiggins, Jr.
Engineer Water Service, Southern, Washington, D. C.

Diesel-watering facilities are composed of supply pipe lines; outlets such as water boxes and post hydrants; and delivery hose. Excessive friction loss results if the supply-pipe lines or the delivery hose is too small to permit the required flow or if the outlets are not designed to permit unrestricted flow. Reduced flow rates caused by excessive friction loss can be overcome by utilizing a booster pump to deliver water at the required rate or can be corrected by installing a properly designed system. The latter method is of course preferable.

The water requirements of a diesel locomotive used only in freight or switching service are limited to water for engine-cooling purposes. This is a relatively small amount. Tank capacities range between a maximum of 300 gal for switcher units and 650 gal for road units. A piping and delivery system designed for a flow of 50 gpm is adequate for diesel-cooling-water servicing. Supply lines 2 in in diameter and delivery hoses 1½ in in diameter will permit a flow of this rate without excessive friction loss, and is recommended for this type service.

Diesel units used in passenger service require water for engine cooling and water for the steam generators used for cooling and air-conditioning of passenger equipment. Tanks for steam-generator water range in capacities between 800 and 2400 gal. The amount of water required to fill the tanks will depend on the number of cars heated or cooled and the train time between watering points. The quantity of water needed will be sufficient to require flow rates of 300 gpm in the supply line, and in the diesel hose the flow will be between 75 and 100 gpm depending on the number of units serviced at one time.

The friction loss created by a flow of 300 gpm through 100 ft of 3-in, 4-in or 6-in pipe is 38.0, 9.3 and 3.1 ft of head, respectively; the friction loss for a flow of 150 gpm through 100 ft of 2-in and 2½-in hose is 53.8 and 18.0 ft, respectively. To avoid excessive friction loss at the flow rates indicated, 4-in or 6-in pipe, preferably 6 in, is recommended for the supply line and 20 ft lengths of 2½-in hose for delivery. The outlet fixtures should be those utilizing long-radius fittings.

The recommended way to overcome reductions in flow rates through water delivery lines at diesel-servicing stations is to analyze the water demands at the station, and design the water-servicing facilities accordingly.

Do Corrugations Influence Rail Life?

To what extent, if any, do rail corrugations influence the life of rail and its renewal cycle in main track? Has the introduction of diesel locomotives increased or decreased the incidence of corrugated rail? Explain.

Two Types of Rail Corrugations

By B. Blowers
Chief Engineer, Erie, Cleveland, Ohio

There are two types of rail corrugation, both from the same cause, i.e., wheel slippage. The first type is caused by wheel slippage on curved or tangent tracks. This slipping results from braking on heavy grades, braking from top speeds on any grade to make station or yard stops or to meet permanent speed restrictions and too rapid acceleration after braking. Wheel slippage, which presumably causes this type of corrugation, occurs when brakes are applied or acceleration is attempted at a time when the train's momentum is sufficient to overcome the skin friction between the wheels and the rails.

In this case both track rails are affected. The corrugations are generally very small, averaging 2 to 3 in apart and are very shallow. They are not capable of measurment with the ordinary taper gauge and are therefore less than 0.001 in deep. These corrugations cause so-called "roaring" track and create very rapid, if slight, vibrations in the running equipment and track structure. The result of this vibration on running equipment is probably negligible, but in the track structure it is very apt to start the track to pumping and result in slightly more track cleaning than would ordinarily be required. We would say, in general, that corrugations of this type do not seriously influence the life of rail or its renewal cycle.

The second type of corrugation occurs on the rails on the low sides of curves. It is caused by slippage of the wheels on the low or short side of the curve compensating for fixed-axle wheel mounting, wheel diameters and difference in travel along the inner and outer rail. This type of corrugation forms quickly when there is considerable curve wear on the high side of the curve which causes wide gage in the track. When the rails are in gage, the wheels wear or dish out at the location of contact with the rails so that the smallest diameter of the wheels is at the location of constant contact with the rails. When there is curve wear on the high side, with consequent wide gage, the wheel on the high side still rides in the dished out portion or smallest diameter of the wheel, while the wheel on the low side now rides on a portion of the face of the wheel not so badly worn or of larger diameter. This aggravates the slippage in this wheel. Wheels on this account can be as much as ⅛ in in diameter larger at point of contact than the corresponding wheel on the high side.

Corrugations from this cause are very pronounced and run from 4 to 6 in or more apart and as much as 0.0625 in depth. Once they start to form they grow very rapidly. It is our opinion that corrugations of this type have a very definite influence on the life of the rail and its renewal cycle. As a matter of fact, if the gage is not watched closely and protected against wear by all means possible, the life of rail can be reduced to from ¼ to ⅓ its normal life span.

Has the introduction of diesel locomotives increased or decreased the incidence of corrugated rail? We would say that incidence of the first type of corrugation is less pronounced since the introduction of diesel locomotives. This is because the advent of dynamic braking has reduced to a great extent the necessity for positive braking and the stepped up or down gear ratios have provided easy acceleration and deceleration.

However, with references to corrugations of the second type, the nosing action of diesel locomotives when rounding curves is much more severe in developing wear on the high sides of curves than was that of the steam engine. The gear-driven axles with fixed wheels on diesel locomotives, being mounted on rigid frames, have a tendency to make the wheel travel in a straight line, thus continually "nosing in" and crowding the high side of the curve. In the old steam engine with its semi-rigid frame and pony trucks to lead the drivers around a curve, the action against the high rail was not so pronounced. This tendency toward greater curve wear on the high rails of curves, which causes extra-wide gage and the incidence of corrugated rail, is greater since the introduction of diesels.

Few rails are ever changed out from corrugations of the first type. Many rails are changed out from corrugations of the second type.

Finishing Interior Concrete Walls

When concrete is used for the walls of office buildings, what is the best finish for the interior surfaces? Explain.

Depends on Type of Service

By B. M. Murdoch

Engineer of Buildings, Illinois Central, Chicago

The best finish for the interior surfaces of concrete walls when used for office buildings depends largely upon the type of office to be provided and the extent of the refinement desired in interior treatment. Generally speaking, the same kind of finish can be employed for the interior surfaces of concrete walls as for any other type of masonry wall.

The finish most widely used today is probably metal lath and plaster. For less important offices, such as shop, yard, store, and miscellaneous roadway offices, the exposed concrete, either poured in place or concrete block, is satisfactory if properly waterproofed to prevent the penetration of dampness through the wall.

Plaster finish using metal lath and plaster on furring strips, or dry wall construction where wallboard is substituted for the lath and plaster, provides the best assurance against formation of dampness and condensation on the inner surface of the wall. This is because this construction permits damp-proofing of the inner surface of the wall and also provides for an air space between the wall and the inside finish.

In the case of unlined concrete walls, more care is required in the construction of forms in order to obtain a satisfactory surface. In the case of concrete block walls chipped or defaced blocks must be rejected and greater care should be used in the laying of the blocks in order to obtain good alinement and uniformity in the thickness and depth of joints.

It is essential that a good waterproofing material be applied over the outer surface to prevent dampness from penetrating the wall. This waterproofing, of course, will have to be renewed from time to time depending upon the life of the material that is used. Waterproofing of the exterior surface of the wall is especially essential if the interior surface is to be decorated.

If the interior surface of a concrete wall is painted, great care should be used in selecting the paint. There are special masonry paints on the market today that are made to resist the peeling or blistering which is caused by moisture working through the wall. This is very important for, with most of the ordinary paints, the moisture coming through the walls will cause them to blister and peel.

Rubber-Base Paint Best

By J. W. Hayes

Architect, Great Northern, St. Paul, Minn.

The best finish for concrete walls has been found to be a good rubber-base paint. This paint should be applied with a spray rather than a brush, because it is easier and a better texture is obtained. The choice of colors with this paint is unlimited.

The next best finish is Portland-cement paint. This paint is more difficult to apply, since it must be brushed on after the walls have been thoroughly dampened. The color selection is also limited.

Ballast Vs. Open-Deck Trestles

What factors should be taken into consideration in deciding whether ballast-deck or open-deck construction should be used on railway trestles? Explain.

Three Important Factors

By G. P. Drew

Assistant Chief Engineer, Union Pacific, Omaha, Nebr.

(1) Economics—The cost of ballast-deck construction will vary between 150 and 200 per cent over the cost of open-deck; therefore, the question of whether the additional expense can be justified must be answered first.

(2) Type of traffic—If traffic is high speed, both freight and passenger, and riding qualities are of importance, the ballast deck can usually be justified, as more uniform surface and alinement can be maintained.

(3) Fire hazard—The open-deck type of trestle, even with fire protection, offers a fire hazard with the incident delays that may occur which few railroads can afford on high-speed main lines in competitive territory.

On main lines, in high-speed competitive territory where schedules must be maintained and delay on account of fire is serious, and where fast passenger schedules require smooth riding tracks, the additional expense of the ballast-deck type of construction can well be justified.

On branch lines and secondary main tracks where speed is not important and competition not excessive, nor traffic delays of serious consequence, the open-deck type of construction should usually be given favorable consideration.

Favors Ballast Decks on Curves

By G. L. STALEY

Bridge Engineer, Missouri-Kansas-Texas, St. Louis, Mo.

The principal use for ballast-deck timber trestles instead of open-deck trestles is on curves and in locations where the ground is slightly unstable. The riding condition of a ballast deck is more easily maintained on curves than is that of an open deck. Any desired change in the super-elevation of the outer rail can be easily made and small changes in alinement can also be made on the ballasted deck, without disturbing the bridge.

Where the ground on which the trestle is built is subject to some movement such as heaving, etc., and a slight bridge movement results, the track is more readily maintained on a ballasted than on an open deck where the fastenings have to be relocated and shims inserted here and there due to settlement. This work on ballast-deck trestles can be done by section gangs.

There is no good reason why a well-designed and well-constructed open-deck timber trestle is not as good as a ballast-deck trestle on tangent track at stable locations. The life of the open-deck trestle under these conditions should equal or exceed that of a ballast-deck trestle and the cost per year should be much less.

Economics Govern

By J. P. DUNNAGAN

Engineer Bridges, Southern Pacific, San Francisco

In deciding whether a ballast or open-deck trestle should be constructed, there are several economic factors to be taken into consideration:

(1) Amount of traffic
(2) Whether main or branch line
(3) Anticipated life of each type based upon the experience of the railroad.
(4) The grade of lumber.

On the main line where there is a definite high traffic density, a creosoted ballast deck should be used as it facilitates maintaining track to line and grade by track forces. The bolts in an open-deck structure eventually become loose, resulting in rough track at high speed.

On branch lines where relatively slow speeds are maintained and traffic is light a ballast deck would have certain advantages, nevertheless economics dictate that open-deck construction be used.

A ballast deck has further inherent advantages in that it eliminates the fire hazard created by brake-shoe slivers and fusees.

The grade of lumber that has been available on the Pacific Coast has deteriorated below that received 20 years ago. However, by creosoting this lumber and placing it in a ballast deck the life is increased to three times that which would be anticipated from an open deck.

LETTERS FROM OUR READERS

Stresses Importance of Engineering Drawings

Savannah, Ga.

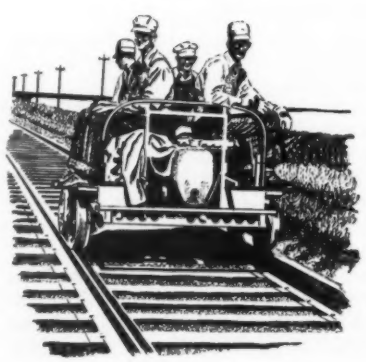
TO THE EDITOR:

No doubt you have already noticed what appears to be an incorrect dimension on the drawing on page 39 of December issue of *Railway Track and Structures,* showing a cross section of the new Santa Fe diesel shop at Argentine, Kan.

Such errors will somehow manage to get by the usual checking and this is not being written in a critical spirit, but to indicate that your readers take considerable interest in and are always glad to see such information published. A drawing so often conveys more and better information than several pages of reading matter and photographs, and I hope that whenever possible you will make such drawings available in the pages of your publication.

Earlier issues of *Railway Engineering and Maintenance,* say as far back as 1913, frequently contained drawings and designs of railway structures that were always instructive and very helpful to your readers, especially those who have much designing to do, and future publication of drawings of well designed structures will always be appreciated.

GEORGE A. BELDEN
Assistant Chief Engineer
Central of Georgia



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Articles Generate World-Wide Interest

Cleveland, Ohio

TO THE EDITOR:

There is so much interest being taken by railroad people all over the world in the Number 24 turnouts that we installed on the New York division east of Port Jervis, N. Y., and we are, from time to time, requested to furnish them with information pertinent to the turnout.

As an answer, I have been giving these people copies of plans of the switch, frog, guard rails, tie layout, and have also been sending them copies of the articles that appeared in the August 1954 issue of *Railway Track and Structures* and the August 16 issue of *Railway Age,* the articles for which you and I gathered details.

Now I am running out of copies of these articles and I wonder whether I could get about a half dozen copies of each from you. They need not be the entire magazine but only the pages containing the articles in question.

A. K. FROST
Assistant to Chief Engineer
Erie

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Wants to Reprint Article in Spanish

Washington, D. C.

TO THE EDITOR:

Our people in Mexico read with a great deal of interest the article, titled "The Art of Track Surfacing," by Leo C. Blanchard, which appeared in the December issue of your excellent publication, and they look forward to receiving the issue containing Part II of the series.

We are in receipt of a request from Guadalajara for permission to translate these two articles into Spanish for the benefit of the personnel on the Ferrocarril del Pacifico, and should appreciate your advising if same can be granted.

We look forward to hearing from you and we should appreciate your calling to Mr. Blanchard's attention the favorable comment his article evoked from our railroad.

F. T. SCANLAN
Special Representative
Ferrocarril del Pacifico
(Pacific Railroad Company)

[Permission granted, and Mr. Blanchard has been advised of the interest expressed in his article.—Ed.]

"THIS YEAR—WE TAKE THE WEEDS Or THE WEEDS TAKE THE RAILROAD!"

A very curt message sent by a Chief Engineer some years ago to the officer who held the purse strings of the railroad. Inability to obtain approval on a weed control program for several years had brought about a right-of-way condition where track work was difficult and the property was unsightly.

The proposed program was approved. And the Engineer made this comment:

> "This railroad has lost an investment that had been built up over a period of years and for which we had obtained a roadbed practically clear of vegetation. Never again can I sit back and approve of anything so penny-wise and pound-foolish."
>
> "It will take us several years using chemical generously to bring our track back to its previous clean condition."

It is *consistent* use of chemical weed and brush killer that pays off.

The growing season is approaching. May we review with you the program under consideration.

READE EST. 1885

READE MANUFACTURING COMPANY, INC.

JERSEY CITY 2, N. J.

WORKS: JERSEY CITY • CHICAGO • KANSAS CITY • MINNEAPOLIS • BIRMINGHAM • STOCKTON

Sure-footed Tournatractor safely crosses trestles and high bridges. Ability to drive along the track is an important advantage . . . sometimes is the only way to reach a job.

Runs to scattered jobs anywhere in your division

Do your scattered earthmoving jobs faster and cheaper with one man and a rubber-tired Tournatractor!

No need to get a work train ready. No time-consuming loading and unloading of equipment. No waiting for dispatchers and a clear track.

Instant-acting 4-wheel air brakes give Tournatractor operator ample margin of safety for working at edge of steep banks. Braking surface totals 2822 sq. in. — 4 times as much as on most vehicles. Low-pressure tires do no damage to ties, rails or switches.

Operator just hops on and goes — over tracks, pavements, bridges, along right-of-way, or highway. Averages a mile every 3 or 4 minutes.

Once on a job, Tournatractor gets right to work. When dozing, it delivers 2½ yds. every few seconds. It also pulls equipment speedily, uproots trees, brush, cuts slopes, etc. Because of its greater speeds, it will outwork the biggest crawler-tractor on almost every assignment. It has 4-wheel drive, instant gear change with constant-mesh transmission, torque converter, powerful 4-wheel disc-type air brakes, and fast fingertip electric control. It's easy to operate, handy to maneuver, safe and dependable, needs little maintenance. It gets work done fast without delays to rail traffic. And it goes from job to job in a hurry!

For fast, economical right-of-way maintenance on your railroad, check further the rubber-tired advantages of Tournatractor. It's a dependable job-proved product of the earthmoving subsidiary of Westinghouse Air Brake Company.

Tournatractor—Trademark T-643-RR-z

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PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

THE MONTH'S NEWS

Railway Personnel

General

R. F. Murphy, assistant to general manager on the Atlantic Coast Line and an engineer through training and experience, has been appointed assistant to general superintendent transportation with headquarters at Wilmington, N. C.

L. W. Howard, valuation engineer on the Illinois Central at Chicago, has been appointed to the newly created position of assistant land and tax commissioner on the Chicago & Western Indiana and the Belt Railway of Chicago at Chicago. The position of valuation engineer on the IC has been abolished, the valuation department having been absorbed into the accounting department.

George C. Vaughan, division superintendent on the Pennsylvania at Baltimore, Md., and an engineer through training and experience, has been named assistant general manager of the Central region with headquarters at Pittsburgh, Pa.

A native of Washington, D. C., Mr. Vaughan was graduated from Lehigh University in 1930 and entered the services of the Pennsylvania on June 23 of that year. After serving in various capacities in the maintenance-of-way department, he was named division engineer at Williamsport, Pa., in 1946. He later served in that capacity on the Pittsburgh divisions, and in 1951 was moved to Indianapolis as assistant superintendent on the Southwestern division. He was advanced to superintendent of the Panhandle division at Pittsburgh in 1952, and was transferred to the Maryland division in the same capacity in April 1953.

William H. Kendall, formerly general manager of the Clinchfield at Erwin, Tenn., and an engineer through training and experience, has been named to the newly created position of assistant to president on the Louisville & Nashville with headquarters at Louisville, Ky.

Mr. Kendall is a native of Somerville, Mass., and was educated at Dartmouth College and Thayer School of Civil Engineering where he received an AB degree in 1932 and a CE degree in 1933, respectively. Following graduation he joined the Pennsylvania as an assistant supervisor of track, later advancing to supervisor of track and division engineer. In 1948 he joined the Atlantic Coast Line as assistant to general manager and shortly thereafter was made assistant to the president. He became general manager of the Clinchfield in October, 1950.

C. S. Sanderson, general superintendent of transportation on the Atlantic Coast Line and an engineer through

training and experience, has been named general manager of the Clinchfield with headquarters with Erwin, Tenn, succeeding **William H. Kendall.**

Mr. Sanderson began his railroad service with the ACL in the engineering department in June, 1923. In 1933 he went with the Charleston & Western Carolina, serving successively as roadmaster and assistant superintendent. During World War II he was staff officer in charge of railway construction and maintenance with the 703rd Railway Grand Division. He returned to the ACL in 1945 as principal assistant engineer at Wilmington, N. C., later serving as assistant chief engineer, assistant general manager and assistant to president, prior to becoming general superintendent of transportation.

E. H. Waring, trainmaster on the Salt Lake division of the Rio Grande, and an engineer through training and experience, has been appointed assistant division superintendent on the Pueblo division with headquarters at Pueblo, Colo.

Engineering

Stephen H. Barlow, assistant engineer of track on the Northern Pacific, has been promoted to system engineer of track with headquarters at St. Paul, Minn., succeeding **G. L. Smith,** who retired December 31 after 44 years of service.

Howard Watts, student engineer on the Seaboard Air Line, has been named to the newly created position of assistant to division engineer on the Alabama division, with headquarters at Americus, Ga. **C. Y. Jordan** has been appointed assistant division engineer at Savannah, Ga.

C. L. Harris, assistant valuation engineer on the Chicago & Western Indiana and Belt Railway of Chicago, has been promoted to valuation engineer at Chicago succeeding **A. L. Atwill,** who has retired.

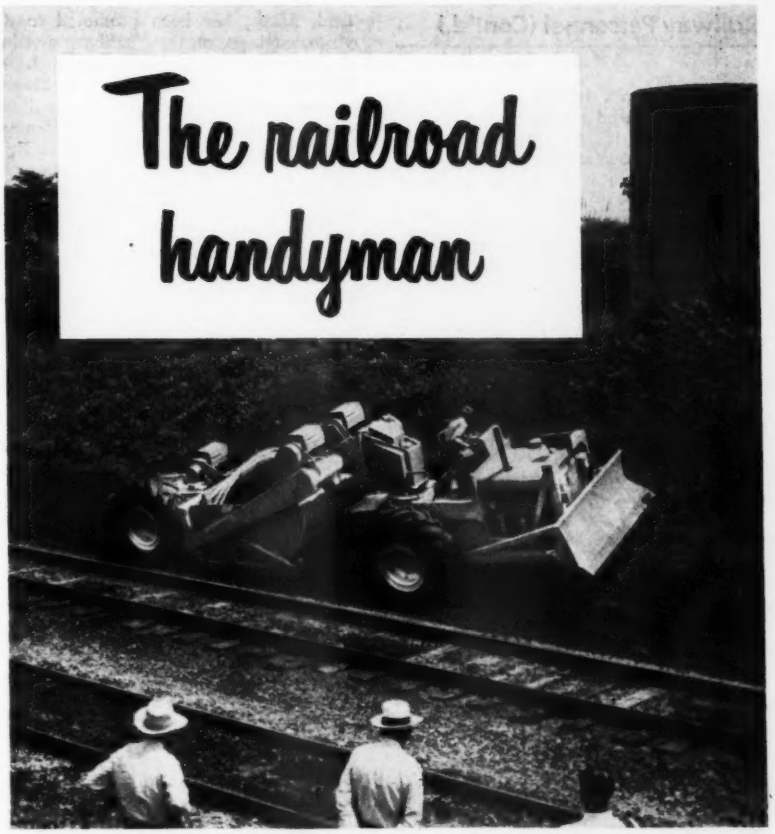
J. R. Williams, assistant to engineer bridges of the Rock Island, has been promoted to assistant engineer bridges at Chicago, succeeding **J. C. Jacobson,** who retired December 31.

C. W. Cabrio, bridge engineer on the Virginian, has been named engineer of structures with headquarters at Norfolk, Va. The position of bridge engineer has been abolished.

H. E. Kirby, cost engineer, Southern Region on the Chesapeake & Ohio, has been named to the newly created position of cost engineer—system, with headquarters as before at Richmond, Va.

W. M. Snow has been named assistant division engineer on the Nickel Plate with headquarters at Brewster, Ohio, and **G. F. Bergold** has been appointed assistant engineer at Cleveland, Ohio. **W. J. Casey** and **A. S. Mazur** have been named assistant structural engineers at Cleveland, and **R. J. Scott** has been appointed field engineer at that same point.

C. E. Fleetham, district supervisor of bridges on the Rock Island at Des Moines, Iowa, has been named division



YOU don't need a lot of on-track equipment to handle scattered maintenance-of-way jobs. One man, working alone with an off-track D Tournapull, can often complete dirtmoving and material handling assignments that take an entire work train and crew. This "railroad handyman" drives anywhere under its own power. A phone call starts it out via track, right-of-way, or public highway. 25 miles is only about an hour away. It self-loads on the small jobs, can be push-loaded in fleet operation. It handles long or short hauls, spreads fill or ballast.

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engineer at Rock Island, Ill. succeeding **F. P. Funda,** who retired December 31. **D. W. Isaacs,** master carpenter at Des Moines has been promoted to district supervisor of bridges at that point to replace Mr. Fleetham. Mr. Isaacs has been succeeded as master carpenter by **L. E. Porter,** assistant division engineer at Rock Island, and **R. J. Lane,** assistant engineer at Little Rock, Ark., has been promoted to assistant division engineer at Rock Island to succeed Mr. Porter.

R. F. Garner, assistant division engineer on the Boston & Maine at Greenfield, Mass., has been promoted to division engineer on the Fitchburg division at that same point, succeeding **J. F. Collins,** who has retired. **D. S. Denio,** assistant division engineer on the Portland division, at Dover, N. H., becomes assistant division engineer at Greenfield to succeed Mr. Garner. **A. T. Sughrue,** track supervisor at Lawrence, Mass., succeeds Mr. Denio as assistant division engineer at Dover. **W. K. Hale,** assistant track supervisor on the New Hampshire division, has been promoted to track supervisor on the Portland division, succeeding Mr. Sughrue. **J. F. Delaney, Jr.** has been named acting assistant track supervisor at Concorn, N. H., succeeding Mr. Hale.

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- **Fast travel speeds . . . up to 22 MPH**
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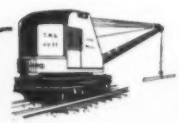

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Earl G. Brisbin, engineer maintenance of way on the Pittsburgh & Lake Erie at Pittsburgh, Pa., has been appointed chief engineer at that same point, succeeding **Frank R. Paisley,** who has retired.

P. C. Fuller, division engineer on the Canadian Pacific at Schreiber, Ont., has been transferred to the Smiths Falls division with headquarters at Smiths Falls, Ont., succeeding **J. L. Looney,** who has resigned.

P. J. Harnish, assistant division engineer on the Pennsylvania at Pittsburgh, Pa., has been promoted to division engineer on the Atlantic division with headquarters at Camden, N. J. **R. A. Westergren,** formerly engineer maintenance of way and structures on the Washington Terminal, has been appointed division engineer on the PRR's Philadelphia division with headquarters at Harrisburg, Pa. **C. E. Gipe,** division engineer at Pittsburgh, has been promoted to engineer, maintenance of way, office of the chief engineer maintenance of way, Central Region, with headquarters at Pittsburgh. **E. M. Hodges,** supervisor of track at New Brunswick, N. J., has been promoted to assistant division engineer on the panhandle division with headquarters at Pittsburgh.

E. P. Peterson, assistant chief engineer on the Western Pacific, and **W. T. Richards,** engineer maintenance of way and structures, both retired from active service December 31 after 33 years and 34 years of service, respectively. As a result of these retirements **Arthur W. Carlson,** bridge engineer, has been named engineer of bridges and structures, with headquarters as before at San Francisco, and **A. D. Quackenbush,** office engineer, has been promoted to principal assistant engineer, with headquarters also at San Francisco. **John C. Miller,** assistant office engineer, has been advanced to office engineer, replacing Mr. Quackenbush.

D. H. Jenkins, bridge and building supervisor on the Cotton Belt at Pine Bluff, Ark., has been promoted to division engineer at that same point, succeeding **J. F. McCurdy,** who retired January 1, after 45 years of service. **R. H. Patterson,** assistant bridge and building supervisor, has been promoted to B & B supervisor, replacing Mr. Jenkins.

Born in Marshall, Mo., in 1887, Mr. McCurdy received his B. S. degree in civil engineering from Virginia Military Institute in 1908. He joined the Cotton Belt engineering department at Pine Bluff later that same year, and after serving in various capacities in the department, he was promoted to assistant division engineer in 1917. During World War I Mr. McCurdy served as a first lieutenant in the Army Engineers. Following his return to the railroad, he was promoted to divison engineer at Pine Bluff in 1923.

E. J. Brown, assistant chief engineer—system of the Burlington Lines with headquarters at Chicago, has been named chief engineer—system at that same point, succeeding **H. A. Aalberg,** who

has retired after more than 44 years of service. Succeeding Mr. Brown, as assistant chief engineer—system, is **H. F. Kimball** hydraulic engineer. **M. L. Johnson,** assistant bridge engineer, has been promoted to bridge engineer, succeeding **F. H. Cramer** who has retired. Mr. Johnson has been succeeded by **W. E. Spade,** assistant to bridge engineer. **Baron Laubenfels,** principal assistant engineer at

E. J. Brown

Chicago, has been named assistant chief engineer, Lines East, at that same point, succeeding **G. W. Gallier,** who also has retired. **S. J. Owens,** district engineer, maintenance of way, at Omaha, has been appointed assistant to the chief engineer with headquarters at Chicago. **L. R. Hall,** roadmaster at Hannibal, Mo., becomes district engineer maintenance of way at Omaha to replace Mr. Owens. **W. G. Farrell,** division engineer on the Hannibal division at Hannibal, has been transferred to Burlington, Iowa, and will assume the duties of division engineer on the Ottumwa division in addition to the Hannibal division, succeeding **F. L. McLean,** who has retired after 45 years of service.

Mr. Brown began his Burlington service in 1918 as a clerk at Chicago. In the years that followed, he served on the Chicago, Aurora and Galesburg divisions as an assistant track foreman, extra gang

H. A. Aalberg

foreman, section foreman, assistant roadmaster and roadmaster. In 1939 he was appointed district engineer at Galesburg, Ill., and in 1942 was named assistant superintendent at that same point. He

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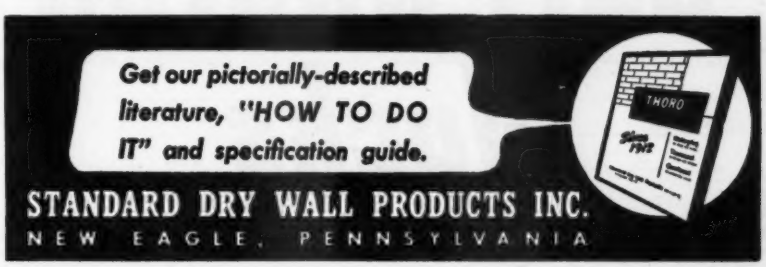
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Railway Personnel (Cont'd)

was appointed engineer of track—system at Chicago in 1943, and became assistant chief engineer in 1953.

Mr. Aalberg, chief engineer since January, 1953, began his career with the Burlington in 1910 as a draftsman at Lincoln, Neb. He was appointed division engineer at Denver in 1916, then returned to Lincoln in 1937 as assistant chief engineer, Lines West. Mr. Aalberg was promoted to assistant chief engineer —system at Chicago in 1946.

W. A. Thomson, whose promotion to engineer of track on the Long Island at Jamaica, N. Y., was announced recently (RT&S, January, p. 66), was born at New Brunswick, N. J., September 24, 1906. He attended New Brunswick high school and took an engineering course from the International Correspondence Schools between 1938 and 1941. He began his railroad service with the Pennsylvania as a trackman on the New York

W. A. Thomson

division in April, 1930. He was promoted to foreman of track in 1932, serving in this capacity until his appointment as assistant supervisor of track at New York and Trenton in 1938. He was advanced to supervisor of track on the PRR in 1941, serving at various locations until 1948 when he was named supervisor of track on the Long Island at Hicksville, N. Y.

R. W. Scott, whose appointment as assistant chief engineer on the Burlington at Lincoln, Neb., was announced recently (RT&S, January, p. 64), was born April 24, 1895, at Upland, Nebr. He attended the University of Nebraska where he received a B. S. degree in civil engineering in 1920. Mr. Scott began his railroad service with the Burlington in May 1917 as a chainman. He served with the army during World War I, after which he again entered service with the Burlington. Between 1920 and 1923 he served as an instrumentman at several points on the system, and from 1923 to 1925 was resident engineer on construction at Beardstown, Ill. During 1926 and 1927 he worked on location and construction projects on the LaCrosse division, and in 1928 he joined the land and industrial department at Chicago. He was promoted

to assistant engineer in the office of the engineer capital expenditures at Chicago in 1932, and in 1939 was named chief clerk at Lincoln, Neb. In 1941 Mr. Scott was appointed division engineer at Alliance, Neb., later serving in this same capacity at Lincoln. He was appointed office engineer in 1946, the position he held before his recent promotion.

Howard T. Seal, who has been named assistant engineer of buildings on the Chesapeake & Ohio at Richmond, Va., (RT&S, January, p. 64), was born at Lynchburg, Va., March 15, 1898. He attended the University of Pennsylvania, and in June 1927 joined the C&O as an architectural draftsman. In November 1942 he was named architectural designer, and was advanced to assistant engineer in November 1951.

K. E. Dunn, who has been named assistant engineer maintenance of way on the New York Central at Cleveland, Ohio, (RT&S December, p. 56), was born April 28, 1913, at Chicago. He attended the Armour Institute of Technology where he received a B. S. degree in civil engineering in 1936, after which he joined the NYC as a draftsman at Chicago. In 1941 he was named engineering

K. E. Dunn

draftsman at Cleveland, and in 1943 was promoted to assistant supervisor of track at Elkhart, Ind. Mr. Dunn was advanced to supervisor of track at Corning, Ohio, in 1945 and was named assistant division engineer at Erie, Pa., in 1948. Between 1951 and 1952 he served as division engineer at Columbus, Ohio, later being named special engineer at Chicago. In 1953 he was appointed industrial engineer with headquarters at New York.

Track

Francis L. Rees, roadmaster on the Oklahoma Division of the Santa Fe, has been appointed acting division engineer on the Eastern division with headquarters at Emporia, Kan. His position on the Oklahoma division will not be filled.

K. H. Carl has been appointed roadmaster on the Rock Island at Dalhart, Tex., succeeding **D. Sullivan,** who has retired. **Lee Dunn,** has been promoted to roadmaster at Amarillo, Tex., succeeding **A. N. Stamos,** who also has retired.

J. J. Kendrick has been appointed as-

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Railway Personnel (Cont'd.)

sistant roadmaster on the Norfolk division of the Norfolk & Western with headquarters at Crewe, Va., succeeding **O. H. Woolwine.**

George Babcock, track supervisor on the Chesapeake & Ohio at Grand Rapids, Mich., has been appointed general track supervisor, Northern Region, with headquarters at Plymouth, Mich. **R. J. Diener** remains as general track supervisor, Northern Region, with headquarters at Saginaw, Mich.

W. B. Newell, supervisor of track on the Pennsylvania at Indianapolis, has been transferred to Northumberland, Pa., replacing **E. S. Bell,** who has entered military service. **H. E. Simmons,** supervisor in the office of the comptroller at Philadelphia, replaces Mr. Newell at Indianapolis. **G. E. Hartsle,** assistant supervisor of track at Harrisburg, Pa., has been promoted to supervisor in the office of the comptroller, and **A. H. Renne, Jr.,** assistant supervisor of track at Aspinwall, Pa., succeeds Mr. Hartsle at Harrisburg. **Harry Gessner,** junior engineer at York, Pa. has been appointed assistant supervisor of track at Aspinwall succeeding Mr. Renne. **B. A. MacLean** has been appointed assistant supervisor of track on the New York division with headquarters at Trenton, N. J. **F. P. Lear** has been named assistant supervisor of track on the Maryland division at York, Pa. **W. A. Town,** and **T. L. Ray** have been appointed assistant supervisors of track on the Pittsburgh division at Johnstown, Pa., and on the Lake division at Cleveland, respectively.

Joe H. Teunas, who has been promoted to roadmaster on the Chicago & North Western at Freemont, Neb. (RT&S, January, p. 70), was born July 4, 1913, at Waukegan, Ill. He attended Kenosha, Wis. high school and night school and began his railroad service with the North Western in April 1936 as a section laborer. He was promoted to section foreman in June 1938 and was named extra gang foreman in April 1939. In 1940 he was appointed steel gang foreman and served in this capacity until being named track supervisor in July, 1949. He was advanced to assistant roadmaster in December 1951.

Edward L. Barnes, whose promotion to roadmaster on the Chicago & North Western at Eagle Grove, Iowa, was announced recently (RT&S, January, p. 70), was born at Tipton, Iowa, April 15, 1921. He attended Tipton Junior College in 1939-40 and joined the North Western as a section laborer at Stanwood, Iowa, in April 1941. He was in military service from July 1942 to September 1945, and returned to the North Western as a timekeeper for extra gangs in 1946. He was named section foreman on the Iowa division 1948, later serving as extra gang and steel gang foreman until being appointed assistant roadmaster at Chicago in October 1952.

Bridge and Building

William Fussell, general foreman of wharves on the Louisville & Nashville at Pensacola, Fla., has been appointed assistant supervisor of bridges and buildings at that same point, succeeding **J. A. Bolling.**

J. D. Martin whose promotion to chief carpenter on the Milwaukee at Butte Mont., was announced recently (RT&S, January, p. 72), was born at Melstone, Mont., September 13, 1914. He began his railroad service with the Milwaukee in the track department in June 1935. Between July and December 1937 he worked for the Phoenix Engineering Corporation, Polson, Mont., and rejoined the Milwaukee in the B&B department in January, 1938. After serving as a carpenter and pile-driver engineer, he was promoted to B&B foreman in April 1950. He was advanced to assistant chief carpenter in June 1953, the position he was holding at the time of his recent promotion.

Special

F. N. Snyder, who has been appointed supervisor work equipment and welding on the Erie at Cleveland, Ohio (RT&S, December, p. 62), was born January 27, 1902 at Scranton, Pa. He attended Lackawaxen School and also studied through the International Correspondence School, joining the Erie as a carpenter helper in January 1918. After

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serving as an equipment operator, plumber helper, locomotive fireman and work equipment helper, he was appointed work equipment repairman at Susquehanna, Pa., in May 1925. He was named foreman on the Delaware division at Susquehanna in May 1938, and was pro-

F. N. Snyder

moted to general foreman—system at Huntington, Ind., in November, 1938. In March 1945 he was appointed assistant supervisor work equipment and welding with headquarters at Cleveland.

R. K. Johnson, superintendent work equipment and reclamation on the Southern Region of the Chesapeake & Ohio, has been appointed superintendent work equipment and reclamation—system, with headquarters as before at Barboursville, W. Va.

Obituary

Robert J. Middleton, retired chief engineer of the Milwaukee, died December 21 at Seattle, Wash.

J. C. Moore, district roadmaster on the Texas & Pacific of Mineola, Tex., died recently after a brief illness.

W. C. Miller, roadmaster on the Kansas City Southern at Pittsburg, Kans., died recently.

Guy E. Martin, superintendent water service on the Illinois Central at Chicago, died January 13 of a heart ailment at Chicago.

Association News

Northwest Maintenance of Way Club

The next meeting of the Northwest Maintenance of Way Club will be held on February 24 at the Midway Civic Club, 1931 University avenue, St. Paul, Minn. The program will be devoted to the subject of weed control, and the principal speaker will be Rockwell Smith, research engineer roadway, Association of American Railroads. Sig Bjerken, supervisor Section of Weed Control, Uni-

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15 ton capacity. The jacks set much more firmly and stand straighter under tie (without damage) or rail, due to large area toe lifts. Trip from either side. Two models have light weight aluminum housings.

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ALSO: A complete line of hydraulic jacks and pullers.

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Lifts, pushes, pulls 15-tons on cap, toe or bolt attachment. Ideal for shimming, lining, painting and replacing timber decks. Two base sizes to fit between ties. Ratchet lowering for safety. Double socket permits use in close quarters.

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Straightens, Spaces Ties. Pumps Rails. Easily applied and removed. Slides along top of rails.

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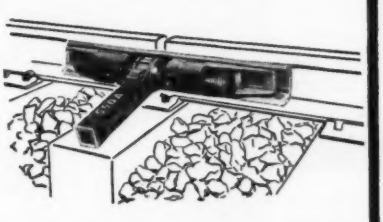

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Association News (Cont'd)

versity of Minnesota Farms, will also speak on the problem of weed control from the viewpoint of state and county agents, with particular emphasis on noxious weeds. Mr. Bjerken's talk will be illustrated with slides. W. J. Cruse, engineer maintenance of way, Great Northern, will act as moderator at this meeting.

National Railway Appliances Association

Manufacturers that have not yet arranged to display their products in the exhibition of the National Railway Appliances Association, to be held in the Coliseum, Chicago, March 14-17, can still make arrangements to do so. It is reported that 12 desirable booths were still available at the time of going to press with this issue. This exhibit will be held in conjunction with the annual convention of the American Railway Engineering Association at the Palmer House, Chicago. Interested manufacturers should address Lewis Thomas, director of exhibits, 59 East Van Buren Street, Chicago 5.

Roadmasters' Association

The Executive committee of the association will hold a meeting on March 14 at the Chicago Engineers' Club, Chicago. This is the day preceding the opening of the AREA convention at the Palmer House in that city. Arrangements are being made to have space in the hotel where meetings of the various subjects committees may be held at various times throughout the AREA convention.

Bridge & Building Association

The next meeting of the Executive committee of the association will be held on Monday, March 14, at the Chicago Engineers' Club. The meeting is being scheduled at that time so that members of the Executive committee may have an opportunity to attend sessions of the AREA convention which will start on the following day at the Palmer House in Chicago.

Metropolitan Maintenance of Way Club

The next meeting will be held on March 3 at the Railroad-Machinery Club, 30 Church street, New York. The formal program will consist of a round-table discussion of "Current Problems of the Track Supervisor." It is expected that about four supervisors from roads in the New York area will give short talks on problems facing them. A. H. Whisler, first vice-president of the club, and assistant engineer, Pennsylvania, will serve as moderator. At the time of going to press the names of the speakers had not been announced.

American Railway Engineering Association

A tentative program has now been set up for the annual meeting which is to be held March 15-17 at the Palmer House in Chicago. Except for addresses to be presented in conjunction with the various committee reports, the program is complete as follows:

Tuesday, March 15, 1955
Grand Ballroom, 9:45-12:00

Address by President B. W. Miller
Reports of Secretary and Treasurer
Greetings from the Signal Section
Greetings from the Electrical Section
Address by R. G. May
Discussion on "Possible Applications of Nuclear Energy by the Railroads"

Grand Ballroom, 2:00-4:45

Reports of Committees
14—Yards and Terminals
16—Economics of Railway Location and Operation

25—Waterways and Harbors
9—Highways
20—Contract Forms
11—Records and Accounts

Wednesday, March 16
Red Lacquer Room, 9:00 to 12:00

Reports of Committees
24—Cooperative Relations with Universities
13—Water, Oil and Sanitation Services
7—Wood Bridges and Trestles
28—Clearances

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30—Impact and Bridge Stresses
8—Masonry
15—Iron and Steel Structures
Association Luncheon, 12:00 Noon

Grand Ballroom
Announcement of results of election of officers
Address by N. R. Crump, vice-president, Canadian Pacific
Red Lacquer Room, 2:30 to 5:15
Reports of Committees
27—Maintenance of Way Work Equipment
22—Economics of Railway Labor
1—Roadway and Ballast
29—Waterproofing
17—Wood Preservation
6—Buildings

Thursday, March 17
Grand Ballroom, 9:00 to 12:30
Reports of Committees
3—Ties
5—Track
Special Committee on Continuous Welded Rail
4—Rail
Panel discussion on "What Standard Rail Length Greater Than 39 ft," and "Continuous Welded Rail."
Closing Business
Installation of Officers

Organizations

American Railway Bridge and Building Association—Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5. Next annual meeting, September 19-21, 1955.

American Railway Engineering Association—Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5. Next annual meeting, March 15, 16 and 17, 1955.

American Wood-Preservers' Association—W. A. Penrose, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—E. C. Patterson, secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6. Next meeting February 28, Hamilton Hotel.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York. Next meeting March 3, Railroad-Machinery Club, 30 Church street, New York.

Mississippi Valley Maintenance of Way Club—P. E. Odom, Secretary-Treasurer, Room 1008, Frisco Building, 906 Olive street, St. Louis 1, Mo.

National Railway Appliances Association—J. B. Templeton, Secretary, Gardner Road, Broadview, Ill.; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Roy M. Edmonds, Secretary-Treasurer, 1221 Locust street, St. Louis 3, Mo. Next annual meeting, October 26-28, Peabody Hotel, Memphis, Tenn.

Roadmasters' and Maintenance of Way Association of America—Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5. Next annual meeting, September 19-21, 1955.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

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BLAW-KNOX Electroforged® STEEL GRATING CROSSINGS

You can build public goodwill, insure a smoother train ride and cut track maintenance with these modern, long life Blaw-Knox crossings.

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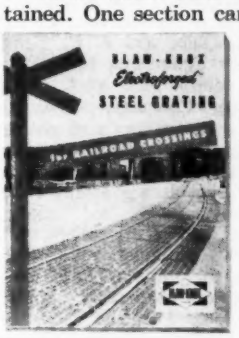

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The Milliken Company, Roanoke, Virginia
Robert J. Wylie Company, St. Paul, Minnesota
J. M. Moore, Denver, Colorado

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Supply Trade News

General

The **H. J. Tierney Supply Company,** St. Louis, Mo. has been named to represent the **Q&C Co.** in the St. Louis and Southwestern territories. **L. E. Hassman,** who formerly represented the Q&C Co. in that territory, has retired from active business.

The **LeTourneau-Westinghouse Company** has entered into an agreement to purchase the plant and assets of the **J. D. Adams Manufacturing Company** of Indianapolis, Ind. Adams, a pioneer manufacturer of roadbuilding and earthmoving equipment, has been in business since 1885. The Adams line consists of motor graders and traveloaders used in the roadbuilding and road maintenance fields.

Adams products will continue to be produced in Indianapolis and Canada, with the plants there to be known as the **Adams Division** of LeTourneau-Westinghouse Company. Present personnel of the Adams Company will continue to operate the newly acquired facilities, and there will be no immediate changes in the distribution, production and managerial policies of the Adams Division.

Nine new dealers have been appointed to sell and service the Michigan line of excavator cranes and tractor shovels, products of the **Construction Machinery Division** of **Clark Equipment Company.**

Appointed to handle both Michigan lines are **Pressed Steel Car Company,** New York, for the territory of Hawaii; **Jackson Machinery Company, Inc.,** New Orleans, for the entire state of Louisiana; **Contractors Service, Inc.,** Charlotte, for the entire state of North Carolina; **Spreitzer, Inc.,** Cedar Rapids, for eastern Iowa; **J. J. Turner, Inc.,** Cleveland, for eastern Ohio; and **J. C. George Construction Equipment, Inc.,** Syracuse, for upper central New York. **Cunningham-Ortmayer Company,** Milwaukee, Wis., has had its territory enlarged to include the Upper Peninsula of Michigan.

Appointed to handle only Michigan tractor shovels are **Midwest Equipment Company,** Fargo, for eastern North Dakota and northwestern Minnesota, and **Midwest Equipment Company,** Bismarck, for western North Dakota and northeastern Montana. Appointed to handle only Michigan excavator cranes is the **Field Machinery Company,** Cambridge, for eastern Massachusetts.

The **Safety Car Heating and Lighting Company, Inc.,** has announced the formation of a new division for the manufacture and marketing of its line of passenger car lighting fixtures and luggage racks, and lighting equipment for stations and terminals. Known as the Lighting Division, the new organization will have its headquarters in a newly acquired plant at Milford, Conn. **Harry W. Jones, Jr.,** has been appointed manager of all operations of the new division.

Personal

John J. Dixon has been named chief engineer of the **Duff-Norton Manufacturing Company** at Pittsburgh, Pa., succeeding **Frank H. Schwerin,** who retired January 1 after 36 years with the company.

Gilbert Hilbrant and **R. B. Dietsche** have been appointed to the sales staff of the **Syntron Company** with headquarters at Chicago. Both men will handle sales and accounts of Syntron's vibratory handling equipment in the Chicago territory.

Monie S. Hudson, who for a number of years has been connected with the **Taylor-Colquitt Company** as research chemist, has established his own consulting service and laboratory, specializing in problems of the wood and wood products industries. His office and laboratory will be situated at Spartanburg, S. C.

Frank H. Fischer, vice president in charge of the Eastern region of the **Wood Preserving Division** of **Koppers Company, Inc.,** has been named executive representative, with responsibility for special sales activities throughout the country. **Paul Wayman,** assistant manager, Eastern region, has been named to the post of acting manager, Eastern region. **Douglas Grymes, Jr.,** sales manager, has been advanced to executive assistant to the general manager, and will continue to serve as sales manager. Headquarters of all three men will continue at Pittsburgh, Pa.

Samuel C. Johnson, vice president of the Eastern division of the railroad department of **Dearborn Chemical Company,** has been appointed vice president of the entire railroad department, following the retirement of **Roger Q. Milnes** as vice president of the Western division.

Mr. Johnson joined Dearborn Chemical in January 1930 as a railroad service engineer. In January, 1937 he was appointed assistant to vice president, later being promoted to assistant vice president, Eastern division, of the railroad department. He was appointed vice president of the Eastern division in January, 1944.

Ray Osborne, district engineer for the **Service Bureau, American Wood Preservers Association,** at Washington, D. C., has been named service engineer for the southeastern territory with headquarters at Atlanta, Ga. **Otto Baltuth,** formerly with the **Wood Treating Division** of **Joslyn Supply & Manufacturing Co.** at Shreveport, La., has been appointed service engineer for the southern territory with headquarters at Bossier City, La. Succeeding Mr. Osborne in Washington is Rear Admiral Donald T. Giles (USN-ret), who was most recently development engineer with the **Wood Preserving Division** of **Koppers Company, Inc.,** at Washington.

Mr. Osborne's territory will include the states of Florida, Georgia, Alabama, North Carolina and South Carolina. Mr. Baltuth will work in Texas, Louisiana, Oklahoma, Arkansas, Tennessee and Mississippi.

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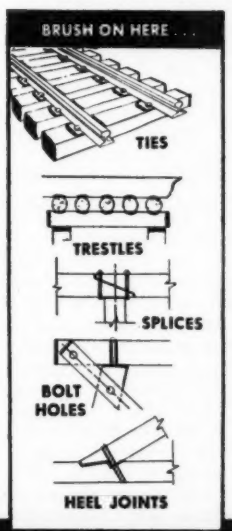

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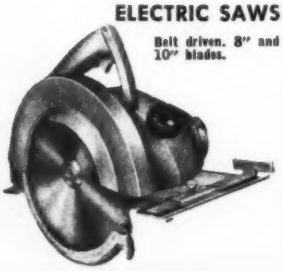

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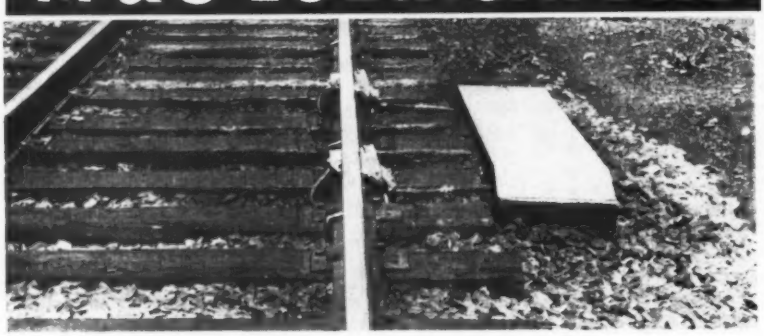

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Maintenance, other than filling the tank with oil, is rarely necessary. The efficient design with automatic lubrication of the two moving parts in each plunger block, results in long trouble-free service life. Easy installation—no rail drilling—no tie spacing. *Note these down-to-earth prices:* Unit as shown above—$298.00. Single plunger unit—$166.50. Write for complete details.

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OWEGO, TIOGA COUNTY, N. Y.

Supply Trade News (Cont'd)

George L. Hudson, executive vice president of the **Western Railroad Supply Company** at Chicago, has been elected president to succeed **S. E. Gillespie,** who has retired after nearly fifty years of service to the railroad industry.

Mr. Hudson was born in Minneapolis in 1906, and was graduated from the University of Minnesota in 1929, with a degree in business administration. He was employed by the Foley Manufacturing Company, Minneapolis, as advertising manager from 1929 until 1935. During the next six years he was sales promotion manager for the Rapinwax Paper Company of Chicago. During World War II, Mr. Hudson served as an infantry major in the Army. Following his discharge in 1945, he became sales manager for the Universal Paper Company at Chicago. He held this position until 1947, when he joined the Enterprise Railway Equipment Company as advertising manager. Early in 1954, Mr. Hudson was elected executive vice president of Western Railroad Supply Company.

George L. Hudson

Paul D. Sullivan, head of contractor sales for the **Le Roi Division** of the **Westinghouse Air Brake Company** at New York, has been appointed assistant sales manager with headquarters at Milwaukee, Wis. Mr. Sullivan will be concerned primarily with promoting the sale of Le Roi portable air compressors and Westinghouse stationary air compressors, both of which are manufactured by the Le Roi Division in Milwaukee.

Mr. Sullivan is a graduate of Mt. Angel College in Oregon, and following his graduation worked as a civil engineer for 14 years in various supervisory capacities on railway, highway and hydro-electric projects. He joined the Clyde Equipment Company in Oregon as a construction machinery sales representative in 1936, and in 1940 he became a resident field engineer in Oregon and southern Washington for the Gardner-Denver Company. He was appointed special representative with Gardner-Denver in 1946, and was in charge of large engineering projects in the Central and Eastern parts of the country. He joined the Le Roi Division about a year ago.

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with fast, portable
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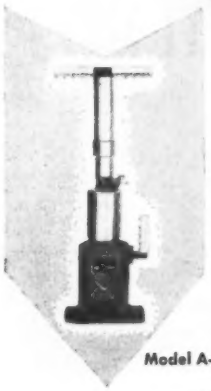

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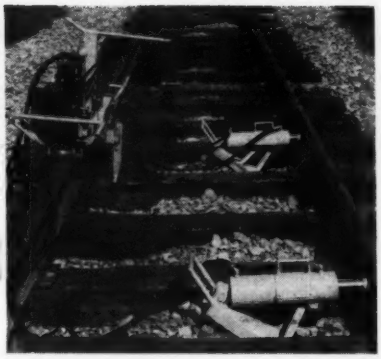

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RU-155

Manufacturers' Literature

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1. HEAT-TREATED TRACKWORK. *Bethlehem Steel Co.* 24-page catalog (379) "Bethlehem Heat-Treated Trackwork" details the development of heat-treated trackwork, describes how heat-treating improves rail steel, gives tables of data on turnouts and crossovers.

2. BUCKETS & DIPPERS. *Pettibone Mulliken Corp.* 6-page fanfold bulletin (T104) describes, illustrates and gives specifications for PMCO buckets and dippers; includes clamshell and dragline buckets, shovel and pullshovel dippers.

3. BALLAST REMOVER. *Pettibone Mulliken Corp.* 8-page 2-color folder (BR 3-51) profusely illustrated with in-action photos describes fully the PMCO speedloader ballast remover.

4. BUCKETS. *George Haiss Mfg. Co., Inc.* 8-page 3-hole punched bulletin (H-175) "A Pettibone Mulliken Product by Haiss" describes, illustrates with photos and drawings, gives capacities and dimensions of the Haiss line of Hi-Power and Multi-Sheave Buckets.

5. SPRAY PAINTING. *The DeVilbiss Co.* 68-page booklet (F-278) "The ABC's of Spray Equipment," in question and answer format, in non-technical language and illustrated with drawings, gives a clearer picture of spray painting.

6. VALVE & FITTINGS. *Lunkenheimer Co.* Comprehensive, illustrated, 4-page circular (601) describes, and gives dimensions for Luncor (all molded PVC valve and fittings).

7. BRAZING ALLOYS. *Air Reduction Sales Co.* Aircosil Brazing Booklet gives complete data on complete new line of Aircosil silver brazing alloys and flux. (Aircosil brazing alloy only type sold on avoirdupois weight of 16 oz. per lb.)

8. WRITE-ON TAPE. *Labelon Tape Co., Inc.* 4-color folder 5 describes Labelon pressure sensitive plastic tape "you can write on"; pictures and description show uses; sample of tape attached.

9. RUBBER ELECTRICAL PROPERTIES. *E. I. duPont de Nemours & Co.* Neoprene Notebook 61 (8th in Language of Rubber series) "Electrical Properties of Rubber" includes discussion of new locomotive jumper featuring demountable neoprene head.

10. BREATHER FILTERS. *Air-Maze Corp.* Folder illustrates and describes complete line of Breather Filters (both "oil-wetted" and "oil bath" types); contains over 24 engineering drawings and photos, includes design and operating advantages.

11. PARTICLE TESTER. *North American Philips Co., Inc.* 8-page booklet (RC-135) "Norelco Portaflux—New Portable Magnetic Particle Test Unit" describes the Portaflux method for checking ferrous metal objects for surface discontinuities; with photos, drawings, and diagrams describes principle of magnetic particle testing.

12. FLEXIBLE COUPLING. *Ajax Flexible Coupling Co., Inc.* Pocket size selection guide (1054) contains technical data—ratings, drawings, specifications, service factors—plus data on uses of Ajax Rubber-Bronze Bushed Flexible Couplings.

13. LUBRICATION. *Alpha Corp.* 4-page 2-color folder (103) "Fringe Area Lubrication With Molykote Lubricants" lists the various types of Molykote molybdenum disulfide lubricant, the temperature range and application methods for each.

14. SAFETY EQUIPMENT. *E. D. Bullard Co.* 20-page Safety Equipment Catalog (#55) gives data on all Bullard safety products with photos and easy-to-read technical details.

15. HEAT TREATING. *Metal Treating Institute.* 16-page booklet "Cost Accounting For Heat Treating" is a complete report of the MTI Cost Accounting Committee's efforts to develop a basic cost system adaptable to all types of heat treating operations.

16. ALUMINUM PROTECTION. *American Chemical Paint Co.* 4-page brochure (1252) describes "Alodine 1000" invisible protection for aluminum, lists typical uses, includes flow sheet and equipment specifications for immersion process.

17. PORTABLE COMPRESSOR. *LeRoi Div. Westinghouse Air Brake Co.* 4-page bulletin (12540100) illustrates and describes exclusive LeRoi features on the 85 cfm Airmaster one unit engine-compressor; includes specifications and tool capacities.

18. WEED KILLER. *American Potash & Chemical Corp.* Two service bulletins on Tronabor borate weed killer contain data on uses along railroad rights-of-way, along fence lines and industrial applications; they describe it as a borate weed killer that permanently sterilizes soil beneath paved surfaces.

19. CABS. *Crenlo, Inc.* Catalog sheet gives construction details and specifications on the Crenlo cab for Model 2TM Trackmobiles; includes simple installation instructions and list of optional accessories.

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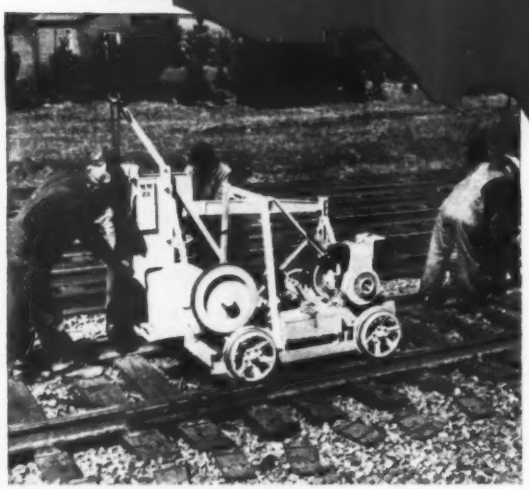

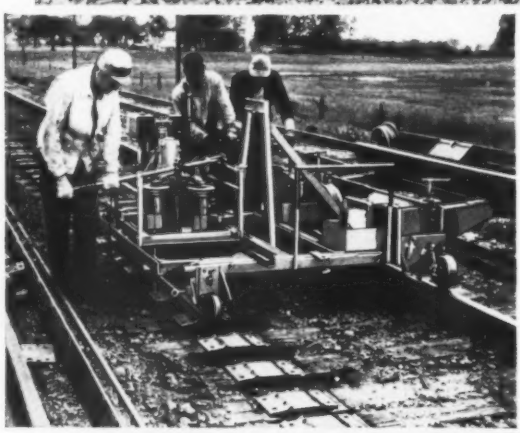

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